STEEL

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SILCROME *Stainless* STEEL

The trade name Silcrome on all grades of Ludlum Stainless Steel is your assurance that the steel was melted by Ludlum and processed under the most modern technical control. Special analyses are available for resistance to extreme heat, weather or chemical corrosion, also for free cutting and ease in working.

LUDLUM

LUDLUM STEEL CO. • WATERVLIET, N. Y.

TOOL STEEL • SILCROME • NITRALLOY

As the Editor Views the News

EXAMINATION of the vote of the senate on the Vinson and Patman bonus bills shows conclusively how supposedly sane individuals will sacrifice their principles on the altar of politics. A score or more senators voted for printing press inflation for no better reason than that they saw a chance to register themselves before the public as "liberals," at the same time realizing that their votes would be made ineffective by presidential veto. With this sad spectacle in mind, how can American industry maintain faith in the ability and will of the federal administration and of congress to deal intelligently and concertedly with problems of recovery?

• • •

Politics Rampant!

Apparently the federal government has drifted far away from the spirit of unselfish co-operation which marked the launching of the new deal. NIRA, AAA, PWA, etc., which were to be conducted on high ethical standards in conformity with the needs of the emergency of 1933, now are mere pawns on the chessboard of cheap politics. Problems involved in the relations between government and industry, which should be solved according to economic principles, are in extreme danger of being settled through raw political chicanery. NIRA has become a political football. Collective bargaining is providing a Roman holiday for ward heelers.

• • •

Prices Hang on NIRA Fate

Now that votes in 1936 have supplanted ideals as the motivating spirit of Washington activity, what will be the fate of NIRA? Latest developments seem to indicate that codes (p. 10) will be limited to wage, hour and trade practice provisions. If the new NIRA is restricted to these features, few if any industries will see any advantage in retaining their codes. In the meantime, the uncertainty as to how congress will act in regard to extending NIRA is creating a complicated price situation. If codes are continued, existing or higher prices (p. 21) may be expected. If the codes are abandoned, a temporary softness in prices may ensue. Again, if inflation should grip the country, a strong price situation would develop. Buyers will do well to keep these alternatives in mind when speculating upon the trend of prices for third-quarter business.

• • •

Profits and Broad Mills

It must be more than a coincidence that the six steel producers which made the greatest profits in the first quarter operate wide strip mills (p. 10) and that of the four companies in red ink during that period one has just completed a wide mill, two will soon build similar units and the other is now investigating the matter. . . . The vote at Toledo (p. 14) was a shock to many executives in the automobile industry. Closing the transmission bottleneck was largely responsible for a drop of 23,470 assemblies in the week ending May 11. . . . Industrial activity generally remains fairly steady (p. 22), with only a moderate recession in STEEL's index of activity. The principal retarding factors are political rather than economic.

• • •

New Series on Open Hearths

For several years engineers have been developing highway guards of steel to replace those of wood post and rail construction carried over from the horse and buggy era. Steel wire cable, strip, sheets and woven wire fencing have been adapted to this use. Now a guard of woven galvanized wire tape (p. 34) is available. . . . Coal windows for residences, apartment houses and public buildings (p. 38) represent a modest but growing market for rolled steel and gray iron, semi-steel and malleable castings. Each unit weighs from 54 to 110 pounds. . . . STEEL announces (p. 45) that another series of articles by William C. Buell Jr. on the design of open-hearth furnaces will begin in an early issue. It will deal with the furnace system below the charging floor.

E. L. Shaner

Limited NRA Extension May End Steel Code Price Filing

IN ALL the thinking Washington is now doing on NRA, price provisions of the steel code appear definitely on the way out.

Chances are that any extension of the national industrial recovery act, the base of NRA, will be by means of the Clark resolution. This limits price control to the mineral natural-resource industries, and iron and steel cannot be construed as such.

The recovery act, and the entire machinery of NRA and all codes as well, expire automatically on June 16 in the absence of affirmative action. It is possible, though not probable, that even the Clark compromise might fail, which would terminate present price filing in iron and steel.

There is also the possibility that the Supreme Court may knock out the basic principles of NRA in ruling on the Schechter poultry case. A ruling is expected before the court adjourns June 3 for the summer, and there may be insufficient time to draft and whip through a brand new law.

Vital Effect on Markets

The odds thus are for an open market on iron and steel for the first time since the steel code took effect Aug. 17, 1933. This opens up a number of potentialities, which indicate a hectic market situation just ahead.

Strictly speaking, the present pricing situation is an open price one; the code does not fix prices but permits their filing with the code authority—the American Iron and Steel institute—and within reasonable competitive limits any producer may file any price. It is possible, though not probable, that filing might be continued even though the code may not direct it. The courts generally have not been kind to open price filing, however.

The federal trade commission, as indicated in its report on the basing point matter March 13, is lying in wait for the steel industry. Shorn of the protection afforded by the code, the industry is open to attack by the commission in event it does not make every producing point a base. It will be recalled that the NRA alternative to the commission's demand was the creation of group mill bases.

While there undoubtedly have been discussions of future courses, iron and steel producers need not face the issue for a month, or until the future of NRA is decided.

The Clark resolution (STEEL May 6, p. 15) would extend the recovery act only to April 1, 1936, on the basis of the foregoing limitation on price control, a broadening of the President's power for review and compliance, and a denial of codes to industries wholly intrastate. Incidentally, most court rulings have classified the actual production of iron and steel to be intrastate, which casts another doubt on the steel code.

Last week efforts were renewed to extend NRA for two years. The Clark extension would bring it up in a presidential year and at a time when congress normally is loath to handle controversial matters for fear of making a bad campaign record. Donald Richberg, chairman of the national industrial recovery board, which is the overlord of NRA, proposed drastic reduction in the power of code authorities, of which the Institute is one, and a softening of compliance regulations to prevent the blue eagle being jerked for minor infractions.

But on Friday, Democratic members of the senate caucused and decided to push the Clark resolution on the original basis, or to next April 1 only. It is feared that an attempt to force a two-year extension would mean a fight which would forestall its passage before June 16. Senator Robinson, Democratic floor leader, said he believed the President would accept this short renewal, enabling congress to adjourn between July 1 and 15.

At Friday's caucus, Democratic senators decided against incorporating in the resolution the 6-hour day and elimination of intrastate business from codes.

Assuming that NRA will be extended, if only on the short basis, Mr. Richberg last week was laying plans for public hearings on all codes, including iron and steel. This was the only activity noticeable at NRA headquarters, which has assumed a graveyard quiet as all problems not requiring urgent attention are being sidetracked until the future of the organization becomes known.

Were price provisions deleted from the steel code, there would remain only the statement of minimum wages, maximum hours, the restriction on new capacity for making pig iron and steel ingots, and trade practices—a scope, in fact, little broader than that offered by the original trade commission trade practice conferences.

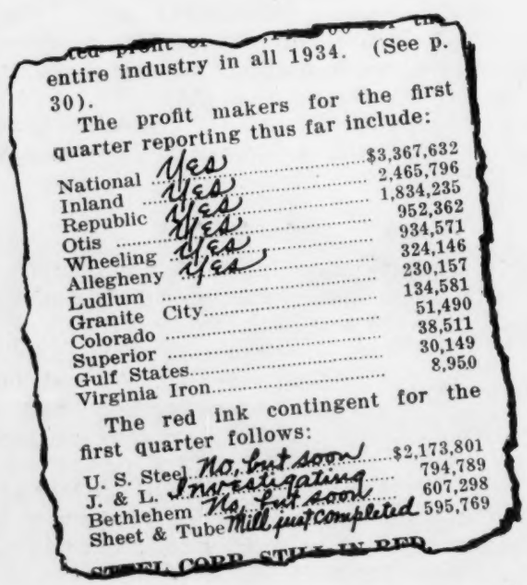
Retain Labor Provisions

A statement by Mr. Richberg Friday indicated what would happen if an industry refused to write a new code in event it were denied price control. A simple code, including only labor provisions, would be promulgated by the President, he said.

Mr. Richberg stated definitely that regardless of any law that may be passed, the board will take up in the future only industries engaged in interstate commerce. Another prob-

Do Wide Sheet Mills Pay?

Other factors, of course, contributed to the showing, yet it is interesting to note that wide strip capacity segregated profit and loss makers in the first quarter. In this table, reproduced from the May 6 STEEL, companies designated by "yes" have wide strip capacity, and when the American Rolling Mill Co. reports it will join the "yes" and profit column. Of the red ink contingent, Sheet & Tube's mill is now completed, the Corporation and Bethlehem have ordered mills, J & L is thinking about one



...ted profit of ... for the entire industry in all 1934. (See p. 30).

The profit makers for the first quarter reporting thus far include:

National (Yes)	$3,367,632
Inland (Yes)	2,465,796
Republic (Yes)	1,834,235
Otis	952,362
Wheeling (Yes)	934,571
Allegheny (Yes)	324,146
Ludlum	230,157
Granite City	134,581
Colorado	51,490
Superior	38,511
Gulf States	30,149
Virginia Iron	8,950

The red ink contingent for the first quarter follows:

U. S. Steel (No, but soon)	$2,173,801
J. & L. (Investigating)	794,789
Bethlehem (No, but soon)	607,298
Sheet & Tube (Mill just completed)	595,769

...EL CORP. STILL IN RED

lem being discussed by the board at this time, he said, is the policy of code administration, with the difference between self-government activities and compulsory activities carted on by public officials.

Word "Authorities" Out

He said that it is essential that there be a new definition of code authorities and suggested that they might be called code committees or code councils but not code "authorities."

Code provisions also have been under discussion by the board, said Mr. Richberg. The discussion has been along the lines of the labor practices, including child labor, minimum wages and maximum hours of wages.

Also included is the matter of trade practices, which have been divided into three sections by the board: (a) not including questions as to the validity of the provisions; (b) permissible trade practices which could be cited to the federal trade commission if necessary, and (c) practices not allowed such as those having a tendency to price fixing, etc.

Move for Simplification

Mr. Richberg also stated that in his opinion the question of enforcement should be much simplified, when the codes referred only to interstate commerce, and he suggested that the code provisions themselves should be simplified.

Mr. Richberg stated that in the proposed new setup he did not believe that the blue eagle would be put in a position where it would be jerked away from a firm and then returned. He said that he believed the blue eagle should stand for co-operation as a whole.

Research and planning division of NRA is sending out questionnaires to the various industries and otherwise bringing all of its data up to date, Mr. Richberg said, with the view of having everything needed at hand so that codes can be redrafted with as little trouble as possible.

Prefer NRA to Die

Some high NRA officials would rather see NRA die now than extend it only 10 months. They maintain it would take almost that long to revise codes, and code assessments would be difficult to collect.

President Roosevelt Friday revealed that he does not contemplate any change in the NRA situation as a result of the railway pension ruling by the Supreme Court. He is not in favor of extending NRA through the Clark resolution, preferring the two-year extension, although the gossip in Washington is that he will accept a compromise. The President's conviction is that NRA can be better clarified than is promised in the Clark resolution.

Mechanization Raises Percentage of Workers 1870-1930, Survey Shows

PROPORTION of the population gainfully employed in the United States increased from 32.4 per cent to 39.8 per cent during the 60 years from 1870 to 1930, while at the same time, the total population increased from 38,500,000 to 122,700,000, or nearly three times, according to a study by the National Industrial Conference board, New York, for the National Machine Tool Builders' association, Cleveland.

At the end of this period, which was marked by rapid technological improvements in industry, vast introduction of labor-saving devices, and enormous mechanization of industry, a larger proportion of the total population was employed in producing goods and services than at the beginning, the Conference board states.

Study Social, Economic Effects

This study is one of a series being made for the Machine Tool Builders by the Conference board. Upon completion, the series is expected to be the first comprehensive survey of mechanization in industry and its effect upon the country from both a social and an economic point of view.

"In 1870 about 7,000,000 workers or more than one-half the total labor force, were engaged in agricultural pursuits," the Conference board states. "By 1900 the number of agricultural workers increased to almost 11,000,000, and has remained practically unchanged since that time.

"During this 60-year period, however, the proportion of agricultural workers in the total working population has declined steadily, until in 1930 farmers represented only a little more than one-fifth of all workers.

"The introduction of machinery was primarily responsible for enabling agriculture to dispense with a large proportion of its workers for the benefit of new and growing industries and still to produce a sufficient volume of foodstuffs and agricultural raw materials to supply the domestic demand and for export."

The total number of persons engaged in gainful occupations at the end of 1930 was 42,829,920, or 39.8 per cent of the population, as against 12,505,923, or 32.4 per cent at the end of 1870.

During this period the machine made possible the transformation of a nation predominantly dependent upon agriculture into a country with extremely diversified economic interests, high standards of living, railroads, automobiles, radios, refrigerators, washing machines, and so on; things which were little used or undreamed of at the beginning of the period and which are regarded as necessities at the present time.

Bridge Can Move 9 Inches

◆

Look closely at the tower leg in the center of this photograph, and note 9 inches left for expansion and contraction of this section of the San Francisco - Oakland bay bridge. Acme photo

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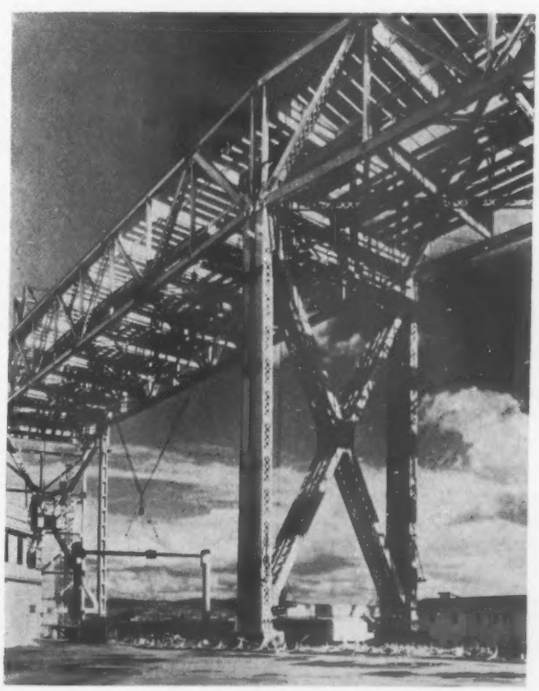


Merger

ATTORNEY GENERAL CUMMINGS stated Friday that his department has not yet decided whether to appeal the decision of Judge Fred M. Raymond in the federal district court at Cleveland, May 3, dismissing the department's suit calculated to prevent the merger of the Republic Steel Corp. and the Corrigan, McKinney Steel Co. He indicated a decision will be reached shortly.

Since an appeal must be filed within 60 days, July 2 is the deadline. In the meantime, or until the government discloses its attitude, nothing further will be done toward consummating the merger. At the outset of the case, in February, a temporary injunction was dispensed with under an agreement to try the case on its merits.

Whether Republic will proceed with the matter of refinancing, including an adjustment in its preferred stock, depends not only upon the government's attitude toward an appeal but also on the state of the securities market. The registration certificate filed with SEC some months ago involved bond issues totaling $67,000,000.

NATIONAL BRIDGE TO J & L?

National Bridge Works, Long Island City, N. Y., having an annual capacity of 12,000 tons, has been acquired by the Jones & Laughlin Steel Corp., Pittsburgh, giving the latter not only structural fabricating capacity in the New York area but also an important distributor of reinforcing bars, it was reported Friday. T. J. Foster is chairman of National Bridge, and H. B. Royer president and general manager.

Meetings

IRON and steel is represented on the program of the twentieth annual international convention of the National Association of Purchasing Agents at the Waldorf-Astoria hotel, New York, May 20-23, by Charles R. Hook, president, American Rolling Mill Co., Middletown, O., and E. L. Shaner, editor of STEEL, Cleveland.

WAREHOUSE GROUP LOOKS FOR RECORD CONVENTION

Advance registrations exceeding 200 indicates the May 14-16 convention of the American Steel Warehouse association at the Edgewater Beach hotel, Chicago, will be the largest in its history.

Harold B. Ressler, president, will open the convention, followed by Walter S. Doxsey, executive secretary. A. J. Copeland, purchasing agent, Industrial Brownhoist Corp., Bay City, Mich., will talk on color marking of steel. C. H. H. Weikel, manager of commercial research, Bethlehem Steel Co., will talk on trends in production, distribution and consumption of steel.

Guy P. Bible, chairman of the association's committee on mill relations, will summarize the work of his committee the past year. G. C. Bartells, American Zinc institute, will speak on "seal of quality" galvanized sheets. Officers will be elected Wednesday. Chicago district warehouses and steel mills will be inspected Thursday.

¶Purchasing Agents' Association of Pittsburgh will hold a monthly meeting in the William Penn hotel, Pittsburgh, May 14.

Financial

NATIONAL STEEL CORP., Pittsburgh, last week filed a registration statement with the securities and exchange commission for $50,000,000 first mortgage sinking fund 4 per cent bonds due June 1, 1965—the largest yet filed by an industrial corporation not in reorganization.

Of the net proceeds, $38,850,000 will be used to redeem $37,000,000 of 5 per cent bonds due 1956, at 105. Also, $2,216,666 will be advanced to the Weirton Coal Co., a subsidiary, to discharge its first mortgage by Jan. 1, 1936.

The remainder will be used for part of the cost of the new wide sheet-strip mill at the Great Lakes Steel Corp. plant at Ecorse, Mich., and for additional working capital.

Another large steel financing project may be revived if the government decides not to appeal the decision in federal court at Cleveland last week checkmating its proposal to block the merger of the Republic Steel Corp. and the Corrigan, McKinney Steel Co. Republic months ago filed a registration certificate for $67,000,000, but this represented four issues, whereas National's $50,000,000 is a single issue.

LUDLUM TELLS EMPLOYES ALL

Ludlum Steel Co., Watervliet, N. Y., continues the policy of advising its employes of the results of its operations financially and the prospect before the company. As of April 25 a special issue of *The Ludlum News* reported to employes that first quarter sales at $1,614,532 were up 23 per cent over a year ago; that the profit was $230,158, against only $170,236 in the first quarter of 1934; that the company is getting its share of the business; and that the outlook for the remainder of this quarter is clouded by many factors.

¶Central Tube Co., Pittsburgh, has declared a 5-cent monthly dividend on the common stock, payable May 25 to May 15 record.

Production

ADVANCES at Wheeling, Buffalo, Chicago and New England pushed the national steel rate up fractionally last week to 44½ per cent, evidencing a little stronger tone in steel production. Ingot production continues a little higher than finishing mill operations. Whether last week's half-point improvement was a trend or merely an irregularity remains to be seen. Details follow:

Youngstown—Steady at 50 per cent, with little change indicated for this week.. An increase late this month is being forecast by valley mill managers.

Pittsburgh—Off 1 point to 36 per cent last week, caused mainly by shipping suspensions on certain automotive steels. A leading independent here is operating at better than the district's average, which is depressed largely by the leading interest's production schedules through last week at 30 to 35 per cent.

Twenty-two out of 60 steelworks blast furnaces are in operation here, a gain of one over a week ago. Bethlehem has resumed with a third stack at Johnstown, Pa., but other rates are unchanged as follows: Carnegie, 8 of 32; Jones & Laughlin, 7 of 11, and National Tube, American Steel & Wire, Pittsburgh Crucible, and Pittsburgh Steel, 1 each.

Wheeling—Up 2 points to 81 per cent last week, there being 30 out of 37 open-hearth furnaces in the district active, compared with 29 a week ago, and 28 two weeks previous.

Chicago—Advanced 1½ points to 52½ per cent, but at least one mill plans to shut down additional open hearths within the next week or two, pointing to a more substantial reduction in the district's average rate. Schedules have varied only 2 to 3 points over the past six weeks. Blast furnace operations are unchanged with 14 of 36 steelworks stacks active.

New England—Up 16 points to 46 per cent last week, two open hearths being added. Schedules planned for this week indicate this rate will be held.

Buffalo—Rose 3 points to 30 per cent last week. One open hearth has been added to the productive list and others are likely to go into operation within another week or two if demand continues to improve. Eleven open hearths are now active.

Birmingham—Held at 54½ per cent last week and this rate is likely to be maintained for this week. There is no intimation of an early resumption of entire activity in open hearths.

Cleveland-Lorain—Down 3 points to 51 per cent, Otis Steel Co. taking off two open hearths to operate four, and National Tube Co., Lorain, adding one unit, to make eight. Corrigan, McKinney Steel Co. continued

with eight. Newton Steel Co. plans to resume production at its Monroe, Mich., sheet mill late this week, following the recent settlement of its strike.

Central eastern seaboard—Fractionally lower at approximately 28 per cent. Little variation is expected this week. One district mill last week put on an extra open-hearth to replenish ingot stocks.

Detroit—Stationary at 82 per cent last week, with little variation indicated.

Denver—Colorado Fuel & Iron Co. is reopening its rail mill at Pueblo, Colo., the middle of May, employing 300 men on a 5-day week basis. The mill is expected to be active most of the summer.

Steelmaking Operations

Percentage of Open Hearth Ingot Capacity Engaged in 10 Leading Districts

	Week ended May 11	Change	Same week 1934	Same week 1933
Pittsburgh	36	— 1	51	24
Chicago	52½	+ 1½	64½	31
Eastern Pa.....	28	— ½	45	16½
Youngstown...	50	None	67	43
Wheeling	81	+ 2	79	65
Cleveland	51	— 3	77	55
Buffalo	30	+ 3	66	38
Birmingham..	54½	None	52	20
New England	46	+16	80	†
Detroit	82	None	100	38
Average.....	44½	+ ½	62	36

†Not reported in 1933.

U. S. STEEL CORP. SHIPMENTS

(Inter-company shipments not included)

(Tons)

	1935	1934	1933	1932
Jan.	534,055	331,777	285,138	426,271
Feb.	583,137	385,500	275,929	413,001
March	668,056	588,209	256,793	388,579
April	591,728	643,009	335,321	395,091
4 mo.	2,376,976	1,948,495	1,153,181	1,622,942
May		745,063	455,302	338,202
June		985,337	603,937	324,746
July		369,938	701,322	272,448
Aug.		378,023	668,155	291,688
Sept.		370,306	575,161	316,019
Oct.		343,962	572,897	310,007
Nov.		366,119	430,358	275,594
Dec.		418,630	600,639	227,576
Yrl. adj.		19,907	44,283	5,160
Total		5,905,966	5,805,235	3,974,062

CORP. SHIPMENTS EASE OFF

Shipments of finished steel by the United States Steel Corp. in April were 591,728 tons, compared with 668,056 tons in March and with 643,009 tons in April, 1934. For four months of 1935 the total is 2,376,976 tons, compared with 1,948,495 tons for the same period of 1934.

Langdon New Head Of Bar Institute

E. W. LANGDON, of Joseph T. Ryerson & Son Inc., Chicago, was elected president of the Concrete Reinforcing Steel institute at its eleventh annual meeting, held at Hot Springs, Va., April 29-May 1.

Other officers elected include: Vice presidents, George E. Routh Jr., Kalman Steel Corp., Bethlehem, Pa., and H. H. Straus, Inland Steel Co., Chicago; treasurer, C. Louis Meyer, Concrete Engineering Co., Omaha, Nebr. R. W. Johnson, Chicago, was re-elected secretary. New directors elected are J. F. Curley, Concrete Steel Co., New York, and William Shank, Paterson-Leitch Co., Cleveland.

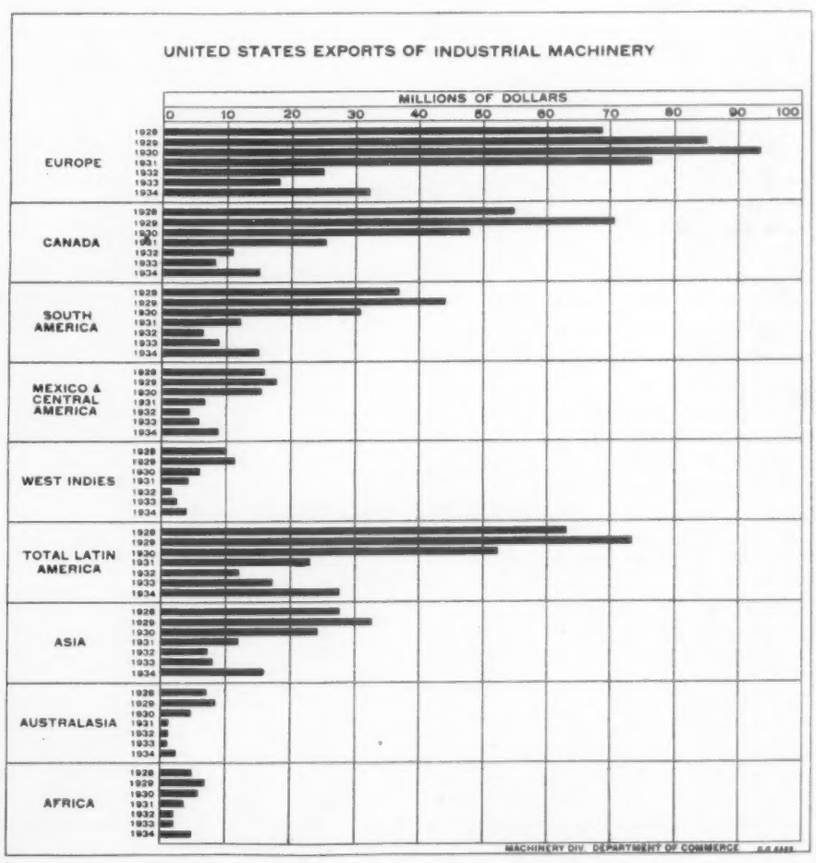
About 125 members of the institute attended the convention, the largest gathering in several years. While discussion regarding the industry's code included some objections to certain features, a vote on retention of the code resulted in unanimous approval.

The retiring president, William H. Pouch, in his address, urged greater co-operation between mills and distributors and between distributors themselves. He pointed out that while the handling of exceptionally large orders at times is more economical when carried out direct by the mills, 90 per cent of all orders should be conducted by distributors.

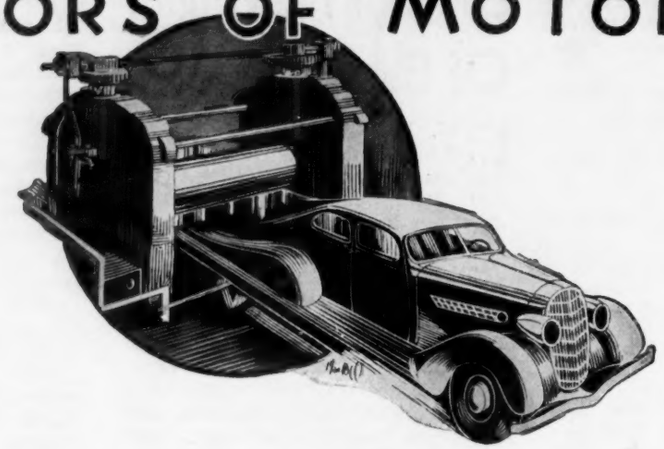
Other principal speakers at the convention included Dr. E. M. Fisher, of the Federal Housing administration; Charles M. Upham, of American Road Builders' association; A. E. Lindau, president, American System of Reinforcing; and Arthur Fisher, counsel for the Reinforcing Materials Fabricating industry.

Industrial Machinery Exports Increase

ONE of the most encouraging signs of world business recovery disclosed in 1934 is that of the United States export trade in industrial machinery, says E. V. Needham, machinery division, department of commerce, Washington. After continuous declines from a peak of $277,765,000 in 1929 to a low of $55,248,000 in 1933, the 1934 figures were encouraging. Exports during the year amounted to $98,349,000, a gain of 78 per cent over 1933, and while it was only 36 per cent of the 1929 figure, the character of trade was encouraging.



MIRRORS OF MOTORDOM



DETROIT

FEELING for the first time the full effect of the strike at the transmission plant in Toledo, Chevrolet production went into a nose dive last week. From the year's peak of 28,000 to 29,000 units, maintained for the past few weeks, assemblies declined almost to 10,000 units.

Assembly lines were operating last week only at Flint and Oakland, Calif., due to the shortage of transmission sets. However, the low spot probably is being passed, as the newly-established transmission plant at Muncie, Ind., was turning out 50 sets an hour by the end of last week and was expected to get up to 100 sets hourly by the middle of this week. General Motors of Canada is starting to make complete transmissions at St. Catharines, Ont.

Chevrolet parts makers and suppliers, instructed to hold up shipments, also have been urged to maintain moderate production, but many have been compelled to suspend on account of lack of storage space. This week probably will see the first of these suspensions canceled, at least in part.

TO CONFER AT TOLEDO

As this was written (late Friday) officials of Chevrolet and General Motors were preparing to go into conference at Toledo Saturday morning with representatives of the American Federation of Labor and the department of labor. It was expected that General Motors would concede some increase in pay, recognition of seniority rights, conferences over grievances—everything within reason except a signed contract that could be construed as a closed union shop.

A bad case of nerves was Detroit's first reaction to the vote last Wednesday when the Toledo workers voted down the company's proposal 2 to 1. Even with the knowledge that Toledo is a hotbed for labor and that much intimidation was being done, it was not believed that the proposal would lose by much. It looked as if the calm assurance that serious labor trouble is not in sight was ill founded.

But as the situation was further analyzed and Saturday's parley agreed upon, it became evident that a general automobile strike is not in prospect. A. F. of L. organizers themselves conceded that, on the basis of the recent votes for employe representatives, their strength does not warrant such sweeping action. But these organizers did indicate that they are concentrating on a few bottleneck plants, and a grip on the heart of a company is more compelling than numerous small pinpricks.

BORE INTO OTHER PLANTS?

It would not be surprising if organization efforts right now are under way at many "key" plants of other automobile manufacturers, and labor may press home with the advantage its Toledo formula has given it. Chevrolet may have the doubtful honor of being chosen first, but it may also have the bad medicine over quickest.

Certainly labor organizers laid their finger on a sensitive spot of General Motors when they closed the Toledo transmission plant. Toledo was the sole source for transmissions for both Chevrolet and Pontiac; henceforth, incidentally, Pontiac will be made at the Buick plant in Flint, and Muncie will not be abandoned regardless of any settlement at Toledo.

Chevrolet has been General Motors' biggest money maker, and the present shutdown is damaging the showing for the second quarter. Chevrolet got away to a late start in comparison with Ford and Plymouth. Already wrestling with a sales problem because the styling was little changed this year, Chevrolet dealers have found it difficult to enthuse over standing for a principle (the open shop) while the new Fords and Plymouths are whizzing by.

Chevrolet last week was contacting its dealers, explaining the fight and trying to enlist them to stand by. It is difficult for a dealer to see the best buying period of the year pass with his floors empty. The dealer angle is an important one.

FORD OUTDISTANCES PACK

By the end of last week, Ford had turned out about 620,000 cars this year, not to include 36,000 of the current model assembled last November and December, compared with 530,000 in all 1934. Plymouth has made a few over 200,000 units, and Chevrolet close to 400,000. All these figures include last week's totals. Ford and Plymouth appear to have been well advised in getting away to a flying start on their 1935 models.

Washington does not appear to be shedding any tears over the plight of Chevrolet; the situation might redound to the benefit of desired labor legislation. Secretary Perkins, it is hinted, might be pleased were Vice President Knudsen and Organizer Dillon to fly to Washington and formally make peace in her office. For the A. F. of L., its ability to tie up so important an interest as Chevrolet offsets some of the sting of its defeat in trying to organize the whole industry.

WHILE production departments are mulling over labor problems, engineering and proving ground staffs are engrossed in designs for 1936. Many have advanced beyond the stage of clay models.

There is a growing feeling that streamlining has been carried too far from the standpoint of comfort, and also that the public is no longer impressed by exaggerated claims for economy. Were a radical streamline car to be driven steadily into a strong head wind at 40 miles an hour or

faster there might be some saving of fuel, but otherwise it is negligible.

Turtle-top taxicabs cruising city streets at 5 miles an hour are the height of incongruity in streamlining. Alfred P. Sloan Jr., president of General Motors, speaks for a considerable portion of the industry when he says, " . . . there are in reality no important economies in the practical sense of the word, in either first cost or operating cost."

There is one large-selling car in which the headroom over the rear seat of the sedan is so scant that a man 5 feet 11 inches tall wearing a derby runs the risk of shearing off his ears at the slightest bump. Ingress and egress with most cars this year can be effected only by assuming a jackknife posture.

Higher car sides and lower tops may mean more tonnage for the steelmaker, but they also greatly narrow the vision and shut out nature. From rural districts are coming complaints that window sills are so high a man can't spit over them.

But make no mistake, streamlining has greatly stimulated styling, and the problem of engineers is to retain the style while discarding the discomfort. Uncomfortable as some new models may be and much as they are recasting human anatomy—for the worse—they are infinitely better looking than pre-depression models. Park a 1935 model alongside a 1929 one and compare the body and fenders!

DESIGNERS IN QUANDARY

This styling is creating a severe problem for some automobile manufacturers who have regarded a continuation of basic body lines an asset. It is increasingly apparent that buyers are not interested in the fact that the Scorcher Eight for 1935 has the same radiator lines as its forebear of 1930. All that counts is the looks of the current model to the buyer.

Ford is the largest selling car today, but does the average Ford salesman beam upon the present fine looking model and brag that it carries on certain traditional body lines? The truth is that the present Ford V-8 looks entirely different from even the V-8 of last year, to say nothing of Model A or Model T. Ford salesmen get gooseflesh even to think that such a car as the Model T is in the family.

Pontiac has scored a big success this year by discarding even the lines of 1934. Olds flashed up like a meteor several years ago—and still remains a bright star in the General Motors firmament—because it completely broke the tradition. It is getting so that the best clincher of a sale is to show that last year's car is completely outmoded, and as noted last week, Chevrolet dealers this year are handicapped by a sameness of 1935 models with 1934.

Designers face a stiff problem in trying to continue basic lines of hood or radiator from year to year. As an example, view the radiator shell of the new low-price Packard: it patently is a compromise between the old and the new, and is practically the only source of criticism of the design.

Buick recently recalled much of the tool and die work that it had done for its 1936 models, scheduled to be shown early this fall, and this has spawned a crop of rumors that the new series will be much more radical than originally contemplated, and that any traces of 1935 Buick in the new 1936 one will be accident rather than design. The new Buick, of course, will have the all-steel top. Steel sheets as large as 85 x 155 inches will be required.

Chevrolet also is the subject of rumors of a distinct break with past design. Cadillac, it is understood, will raise its roof 2 inches in 1936 models to provide greater headroom. The engineers for one maker are designing a rear door that will be incorporated partly in the rear fender; this will permit the door to be practically as wide at the bottom as at the top, and be a contribution to comfort. All-steel tops may hasten the day when doors are recessed into the top, also for greater ease of egress and ingress.

Reference was made last week to Ford applying deadeners to the inside of closed bodies to quiet the drumming set up both by the new roof contour and the increase in the length of the driveshaft occasioned by moving the engine forward 8½ inches. But Ford is not alone in this, as practically all other makers face the same problem. The additional work Ford is doing costs about $1.15 per car, and with the program calling for 500,000 more cars this year, this is going to cost Ford more than a half million dollars.

Speaking of design, the alacrity with which designers have seized upon wide sheets, as evidenced by the all-steel top, and the trend toward all-steel bodies is giving many a plant management a headache.

SAY FAREWELL TO SOFT TOPS

At the moment, only Hudson-Terraplane actually mounts an all-steel body, and how it is bragging about it! All other cars have either a soft top or use wood somewhere in their body construction. What Fisher Body and Murray, to name only two, would give if they did not have such large investments in timber and in woodworking plants.

With Hudson-Terraplane firing broadsides at composite bodies, Fisher pushing its all-steel turret top, and Ford certainly going to the all-steel top next year—which was one reason for putting in the new wide-sheet strip mill at the Rouge—woe to the maker trying to get by with a soft top in 1936.

Still an unknown factor but possessing great potentiality in the way of more comfortable design, is the rear-engine car. With the driveshaft eliminated, designers may be enabled to increase headroom perceptibly without sacrificing low center of gravity.

William B. Stout mounts the Ford V-8 engine in the rear of his new $5000 scarab series. General Motors has been doing much experimenting with rear-engine design at its Detroit laboratory; this experience will be available to all General Motors lines, but no production models are expected to be marketed so early as 1936.

AS CHEVROLET production was declining 18,000 units last week Ford went off about 5000, putting daily production at about 5900 units, 6 days. The used car situation is backing up on Ford, although a strenuous campaign to move trade-ins is being waged. Ford's total last week was 35,045 cars.

Olds was bowling along at 4650 units, its April retail sales—18,554 units—being an alltime record for any month and larger than the total for the first four months of 1934. From Jan. 1 to April 30, 64,557 Olds were assembled, against 26,309 a year ago.

Hudson-Terraplane was up slightly last week to about 2800 units. April sales, a gain of 2000 over March, broke all records since April, 1931. Packard has eased a little but it still is making a few more than 200 of the small cars daily, and 20 of the large cars, against a weekly total of 125 a year ago.

Total production last week was 87,395 units, according to Cram's, a drop of 23,000, accounted for by 18,000 by Chevrolet and 5000 by Ford. This is the poorest week since that ended March 9.

Automobile Production

Passenger Cars and Trucks—U. S. Only
By Department of Commerce

	1933	1934	1935
Jan.	128,825	155,666	292,765
Feb.	105,447	230,256	340,544
Mar.	115,272	338,434	429,830
Apr.	176,432	352,975	*475,000
4 mo.	525,976	1,077,331	*1,538,139
May	214,411	330,455	.....
June	249,727	306,477	.....
July	229,357	264,933	.....
Aug.	232,855	234,811	.....
Sept.	191,800	170,007	.....
Oct.	134,683	131,991	.....
Nov.	60,683	83,482	.....
Dec.	80,565	153,624	.....
Year	1,920,057	2,753,111	.....

*Estimated.

Estimated by *Cram's Reports*

Week ended:

May 4	110,865
May 11	87,395

WINDOWS OF WASHINGTON

WASHINGTON

FIRST meeting of the advisory committee on allotments, set up by the President to pass on projects for the $4,000,000,000 emergency relief program, was held at the White House last week with the President himself presiding. It was decided to hold two meetings a week at the same place.

At his press conference the President stated that at this first meeting there was a discussion of questions of policy, taking up long time projects, loans to cities and similar matters, with no public announcement of the adoption of any set policy to this time.

At this meeting the committee segregated $2,000,000,000 of the $4,800,000,000. The $800,000,000 has already been earmarked by congress for actual relief—so that there still remains $2,000,000,000 not allocated.

Funds for Grade Crossings

Of the $2,000,000,000 allocated, $400,000,000 was for highways, roads, grade crossing eliminations, with no special segregation of this amount. Also, in this connection, it was stated at the White House that there may be no special grade crossing elimination division as at first announced.

It is practically definitely established now that Thomas Macdonald, director of the bureau of public roads, will administer this grade crossing elimination money. He may have some executive working under him—but he will be the real head, whether or not a special division is established.

The advisory committee also allocated $250,000,000 for rural rehabilitation, including $50,000,000 for rural electrification; $225,000,000 for housing; $150,000,000 for assistance for educational, professional and clerical persons; $300,000,000 for CCC; $450,000,000 for loans or grants or both for states, etc.; and $175,000,000 for sanitation, etc.

The committee has not yet passed on any definite projects and the road people in particular are champing at the bit, inasmuch as they state that they have been ready to "shoot" for some weeks with actual projects. They call attention to the fact that every day of delay is bad—and that the President should act quickly.

STEEL LABOR BOARD JITTERY AS FUTURE IS UNCERTAIN

Officials of the national steel labor relations board are on the anxious seat these days, wondering what is to become of them after June 16, when the NRA act expires.

In addition to the extension of this act, which of course is expected, considerable more will have to be done before the steel board is allowed to continue.

First, that board was organized under the NRA act, then under public resolution 44 of the seventy-third congress, and lastly by an executive order of the President.

Therefore, the board becomes nonexistent on June 16 unless action is taken on all three of these measures or unless some other way is found to continue its existence.

Up to this time members of the board do not know what action will be taken in connection with their work.

Incidentally, the board last week gave the Weirton Steel Co., Weirton, W. Va., a clean bill of health in regard to the charge brought by Mel Moore, a sheet roller, that he was discharged for union affiliation and activity. The board last week also notified both the Commercial Foundry Co., St. Louis, and the Petroleum Iron Works, Beaumont, Tex., to reinstate certain employes on the penalty of having their blue eagle yanked.

The labor board stubbed its toe last week when the Berger Mfg. Co., Canton, O., subsidiary of the Republic Steel Corp., enjoined it in the District of Columbia supreme court from certifying a complaint over an election.

PWA RAILROAD MATERIAL PROGRAM 90% COMPLETED

The railroad construction and improvement program of PWA, commenced last year, is now more than 90 per cent completed.

In addition to $53,000,000 loaned to finance the building of freight cars, PWA loaned $145,000,000 for building locomotives and passenger cars, streamlined trains, purchasing and laying rails and making general roadway improvements.

With indirect and industrial employment nearly three times as great as direct employment on construction sites, approximately 56,000,000 hours of both types of work were created by the manufacture of the 25,431 freight cars for which the $53,000,000 loan was made. Indirect employment on rail manufacture was even greater than on freight car building, being in the ratio of 4 to 1.

COURT GIVES HEADACHE; PRESIDENT OFFERS ASPIRIN

The United States Supreme Court by its 5 to 4 decision holding the railroad retirement act unconstitutional gave the New Dealers the jitters last week. They have not yet quite got over it—although they recovered to some extent by the latter part of the week, on the insistence of the President that the social reform bill should be gone through with even if they have to get an opinion from the attorney general, which the senate finance committee has proceeeded to do.

It was the contention after the decision was rendered last Monday by some ardent New Dealers that not only the social reform bill but also

the NRA and other New Deal pets were doomed. However, the attitude changed during the course of the week and it is now believed that some way will be found to circumvent the decision.

Dealing with this matter, James A. Emery, general counsel of the National Association of Manufacturers, in a special advisory statement to its members, stated that the decision in this railway pension case has a significance "far beyond its present application for it operates against the taxing power no less than against the commerce power or any other authority against the misuse of which it is the people's protection."

Mr. Emery pointed out further that "despite the existence of dissent, the court was not divided but was unanimous on the major proposition that the act as written was 'beyond the power of congress.' "

PRESIDENT AGAIN NETTLED BY OPPOSITION OF BUSINESS

There was considerable criticism here last week of the President for the manner in which he attempted to kick back at the chamber of commerce of the United States for its attitude on his program.

Three annual meetings of this body have been held since Mr. Roosevelt has been in the White House, and it has seemed to some that at each convention he has taken the chance to "knock" the business and industrial interests of the country through the national chamber.

While he may have had some cause to have been dissatisfied at the attitude of the body this year, that certainly does not apply to former years and yet his attitude has been much the same.

It is most interesting to note that only since Mr. Roosevelt has been in the White House has the President of the United States failed to send greetings to the body and in a number of instances the Presidents have made speeches in person.

It was the idea of many attending the press conference immediately following the adjournment of the chamber's annual convention that the President was unusually disturbed in his attitude toward that body.

Without mentioning the chamber but by slightly veiled innuendoes he pointed out to press representatives how he had observed during the years that chambers of commerce, merchants associations and similar bodies did not really represent the thought of their members. Moreover, he punctuated his remarks by choice bits of sarcasm toward business and industry in general.

PEEK TO SUCCEED ROPER?

Rumors are persistent that in event Postmaster General Farley leaves the federal service this fall to devote his entire time to politics, Secretary of Commerce Daniel C. Roper will become postmaster general. In turn, George N. Peek, now foreign trade adviser to the President, is reported to be in line to head up the department of commerce.

Dawes Still Confident Sudden Business Rise Near

GEN. CHARLES G. DAWES, Chicago banker and former vice president, remains an unconquerable optimist. He is standing pat on his prediction (STEEL, *Jan.* 21, *p.* 14) *that prosperity will return in June or July with a sudden and unexpected rise. This prophecy is based on the fact that the great depression of* 1873 *and* 1893 *terminated with sudden demand for heavy durable goods which occurred about five years and seven months after the beginning of these depressions.*

Steel in the News

AMERICAN Steel & Wire Co., Cleveland; Steinway & Sons, New York; and L. C. Smith & Corona Typewriters Inc., Syracuse, N. Y., are co-operating in the manufacture of a stainless steel piano, it developed last week.

American Steel & Wire is providing the strings, case, and all-metal sounding board. William Braid White, acoustical engineer and assistant to Dennis Merriman, sales manager, Chicago, has assisted in developing the design. The wire is being made at the Worcester, Mass., works of the company. An American Bridge Co. engineer designed the frame.

L. C. Smith & Corona Typewriters Inc. is contributing certain mechanical parts. The marketing is to be done by Steinway.

It is reported that the all-steel piano weighs 400 pounds, against 575 pounds for orthodox types, and that an improved tone quality is indicated.

Labor

HOUSE labor committee Thursday ordered a favorable report on the Wagner-Connery labor disputes bill, against which industry has brought probably the greatest pressure ever exerted in opposition to a measure.

The house version of the bill would place the proposed labor relations board, to enforce collective bargaining and hobble company employe plans, under the jurisdiction of the labor department as urged by Secretary of Labor Perkins. The senate bill, however, would make the labor board an independent agency.

Amalgamated Association of Iron, Steel and Tin Workers last week was tendering invitations to the 12 lodges it ousted a few months ago to reorganize and re-enter. First lodge to be re-formed was Valley lodge 185, of Cleveland, replacing the ousted Riverside lodge.

It also developed last week that in the haste to organize steel workers under 7a the matter of per capita tax was not pressed and a number of adjustments between lodges, some of them expelled for rank-and-file heresy, and the Amalgamated itself, is in order.

Died:

EDWARD M. ADAMS, 58, first vice president in charge of sales and a director of the Inland Steel Co., Chicago, in Hot Springs, Ark., May 8. Born in Cherry Valley, Ill., Dec. 1, 1876, as a young man he was with the Illinois Central railroad, later being associated with the Buda Co., Harvey, Ill., as purchasing agent and in other capacities. In 1907 he joined the Inland Steel Co. as secretary in charge of the credit department and was also active in a sales capacity. In 1918 he was elected a director of the company and in 1921 became a vice president, also remaining as secretary. On Jan. 31, 1922, he was elected first vice president and general sales manager, which position he has held ever since. He was a member of the commercial committee of the American Iron and Steel institute and a number of Chicago clubs.

♦ ♦ ♦

A. Lyle Linderman, 46, secretary and treasurer of Neely Nut & Bolt Co., Pittsburgh, in that city May 8.

♦ ♦ ♦

Alfred E. Hammer, 77, president, treasurer and general manager of the Malleable Iron Fittings Co., Branford, Conn., in that city, May 9.

♦ ♦ ♦

Benjamin Page, 66, early in his business career secretary of Monongahela Connecting railroad and an employe in other capacities for Jones & Laughlin Steel Corp., in Pittsburgh, May 7.

♦ ♦ ♦

Edwin C. Kraft, 65, veteran employe of American Sheet & Tin Plate Co., in Pittsburgh recently. He entered the employ of the company in Chicago in 1898, was subsequently transferred to New York, and then to Pittsburgh in 1904.

♦ ♦ ♦

Albert J. Bates, 72, inventor and former president of the Bates Expanded Steel Truss Co., East Chicago, Ind., in Miami, Fla., May 8. He was

the inventor of a number of machines used in the manufacture of wire products, in addition to holding patents on the expanded steel truss.

♦ ♦ ♦

Frank Hughes, 50, an official of the old Globe Stove & Range Co., now the Globe American Corp., Kokomo, Ind., in Winter Haven, Fla., recently.

♦ ♦ ♦

F. R. Klein, 51, vice president and general manager of Klein-Logan Co., Pittsburgh, manufacturer of coal miners' and railroad track tools, in Pittsburgh, May 4.

♦ ♦ ♦

Melville J. Horsey, 57 manager of the Greenfield Tap & Die Corp. of Canada, in Galt, Ont., April 30. He

Edward M. Adams

formerly was engaged in machine tool production in Buffalo.

♦ ♦ ♦

Charles A. Weaver, 68, president of the Metal Stamping & Fixture Co., Batavia, N. Y., in that city, recently. He founded the company in 1916 and continued as its head until his death.

♦ ♦ ♦

George F. Sheldon, 48, office manager at the Coraopolis, Pa., plant of the Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y., in Coraopolis, May 6. Born in Rock Falls, Ill., he had been associated with the bolt and nut company, for 27 years.

♦ ♦ ♦

A. M. Le Tellier, 46, vice president and general manager of the Cuyahoga Steel & Wire Co., Bedford, O., in Cleveland, May 4. He had been manager of the Cuyahoga company for eight years, prior to that being associated with the Union Drawn Steel Co., Massillon, O. He was born in Charlottesville, Va.

Industrial Men In Day's News

M. L. Eckman, Head of Research and Development Department, Thomson-Gibb Electric Welding Co.

He has had wide experience with both users and manufacturers of welding equipment.

For a number of years he was active with Ford, supervising all welding operations of this car builder.

Later associated with welding machine builders, he spent several years in Europe for one interest.

M. L. ECKMAN, now head of the research and development department of Thomson-Gibb Electric Welding Co., Lynn, Mass., has a record of many years active participation in the welding industry.

Born in Butler, Pa., he served an apprenticeship as machinist there, leaving to become associated with the Engineers' & Foundrymen's Laboratories, Pittsburgh. Later he removed to Detroit to gain experience in various jobbing and tool shops, for a time being foreman of the tool trouble department at Timken-Detroit Axle Co.

His next association was with the Ford Motor Co., where he was assistant superintendent in charge of the motor room, foreman in charge of the machine construction department, and supervisor in charge of welding, including acetylene, arc and resistance types.

He left Ford to take up work with Taylor-Winfield Corp., Warren, O., where he was active in modernizing their methods and designs. Later, as welding development engineer for Federal Machine & Welder Co., Warren, he spent some time in Europe to supervise installation of this company's machinery in England, France, Germany and Italy, and to assist in training the welding personnel of large manufacturers there.

After five years' association with Federal, he left last December to take up his new position.

♦ ♦ ♦

A. J. Kieckhefer, president of the National Enameling & Stamping Co., Milwaukee, has been elected to the board of directors of Allis-Chalmers Mfg. Co., Milwaukee.

♦ ♦ ♦

W. N. Dieche, formerly in the purchasing department of the Seaman Body Corp., Milwaukee, recently was made purchasing agent of the Perfex Radiator Co., also of that city. He succeeded L. W. Kleinhaus.

♦ ♦ ♦

E. S. Rooney, who retired last fall as Cincinnati district sales manager for Youngstown Sheet & Tube Co. after being with the company for 28 years, has become associated with the Cincinnati sales office of Stran-Steel Corp., Detroit, manufacturer of a special type of steel framing for houses, apartments and other buildings. His headquarters are 203 Brotherhood Railway Clerks building.

♦ ♦ ♦

J. L. Mauthe, formerly assistant general superintendent of the National Tube Co. plant at Lorain, O., has been appointed assistant general superintendent at the Campbell works of Youngstown Sheet & Tube Co., Youngstown, O. This follows upon promotion of A. W. Smith to plant manager of the eastern division of the company. Mr. Mauthe has been in metallurgical and operating departments of the steel industry since 1918.

♦ ♦ ♦

Robert E. Cecil has been elected a vice president in charge of sales of Wm. B. Scaife & Sons Co., Oakmont, Pa., manufacturer of riveted, welded and copper-brazed tanks for

air, gas and liquids. He has been aligned with the Scaife organization since the liquidation of the Air Tight Steel Tank Co., of which he was formerly president. He is also a member of the A. S. M. E. boiler code committee.

Dale N. Randolph, associated with the Scaife company for over 25 years, has been elected vice president of the company's purifying department.

♦ ♦ ♦

Carlos Krebs has been named president of the General Welding & Equipment Co., 28 Carleton street, Boston, succeeding T. F. Stoddard, resigned.

Richard B. Cross has become a director and general manager of the company.

♦ ♦ ♦

J. E. Holveck has been appointed special sales engineer in the Pittsburgh office of Worthington Pump & Machinery Corp., Harrison, N. J. His activities will extend to the territories of Cleveland, Detroit, Chicago and Buffalo offices of the corporation. Formerly a member of the engineering staff of Worthington's Holyoke works and later associated with the Aldrich Pump Co. as sales engineer in the Middle West, he has been responsible for many developments in pumping equipment and hydraulic accessories.

♦ ♦ ♦

William J. Schenler has been appointed chief engineer of the mines and quarries of the Colorado Fuel & Iron Co., Denver, succeeding the late Doyle A. Stout.

♦ ♦ ♦

Harry O. Lang has been appointed vice president and general manager of sales of the Heppenstall Co. of Detroit. He has previously been associated with Crucible Steel Co. of

To Discuss Obsolescence, Mills, Weight Reduction at Institute

THREE experts in their respective lines will be headliners at the technical session of the American Iron and Steel institute meeting in New York, May 23, at the Hotel Commodore at 2 p. m.

The three and their subjects are: J. C. Whetzel, American Sheet & Tin Plate Co., Pittsburgh, "Modern Steels and Weight Reduction"; S. M. Weckstein, Timken Roller Bearing Co., Canton, O., "Precision Mills for Rolling Strip, Bars and Rods"; and D. M. Petty, Bethlehem Steel Co., Bethlehem, Pa., "The Economic Importance of the Replacement of Obsolete Equipment in Steel Mills."

Mr. Whetzel is assistant to the vice president of American Sheet & Tin Plate Co. His first business affiliation was as chemical engineer with Security Cement & Lime Co., Berkeley, W. Va., from 1914 to 1915. During the war years, 1917-1919, he was first lieutenant in the chemical warfare service and was stationed at both Washington and in France.

J. C. Whetzel

Upon the close of the war he became a chemical engineer for E. I. du Pont de Nemours & Co., Wilmington, Del. Shortly thereafter he became affiliated with the chemical engineering research laboratory of American Sheet & Tin Plate Co., a position he held until 1922. From 1922 until 1929 Mr. Whetzel was manager of the American Sheet & Tin Plate research laboratory, and since 1932 he has been assistant to the vice president.

Mr. Whetzel is a graduate of Washington and Lee university, and holds a postgraduate degree from Massachusetts Institute of Technology. He is a member of the American Iron and Steel institute, American Electrochemical society, American Chemical society and American Institute of Mining and Metallurgical Engineers, as well as several Pittsburgh clubs.

Mr. Weckstein, who is assistant chief engineer of the Timken company, was graduated from the Stevens Institute of Technology in 1923 with the degree of M. E. In the same year he joined the industrial engineering department of Timken, making a special study of the design and application of bearings in industrial equipment, in 1926 becoming chief of that department. In 1927 the industrial engineering and rolling mill divisions were combined and Mr. Weckstein took charge of the new department. Since then he has been engaged in antifriction bearing developments, particularly in the industrial field. He is a member of the American Society of Mechanical Engineers and the Association of Iron and Steel Electrical Engineers.

Mr. Petty, who is now superintendent of the service division of Bethlehem, at its Bethlehem plant, was graduated from Lehigh university with the degree of E. E. in 1909. He is a past president of the Association of Iron and Steel Electrical Engineers.

S. M. Weckstein

D. M. Petty

America in Detroit, the Remington Arms Co., Bridgeport, Conn., and

Harry O. Lang

Billings & Spencer Co., Hartford, Conn. His headquarters will be at the Heppenstall main office and warehouse in Detroit.

♦ ♦ ♦

Karr Parker, president of McCarthy Bros. & Ford, Buffalo, has been elected president of the Electrical League of the Niagara Frontier. Other officers are: Vice presidents, George J. Reickert and Herbert I. Sackett; secretary-treasurer, Richard Whale; and managing-director, Samuel S. Vineberg.

♦ ♦ ♦

Stephen F. Briggs, one of the founders and president of the Briggs & Stratton Corp., Milwaukee, manufacturer of automobile locks and allied products, has been elected to the newly created office of chairman of the board.

Charles L. Coughlin, formerly vice president, succeeds him as president.

♦ ♦ ♦

W. M. Smith, 50 Church street, New York, has been appointed to manage engineering and sales activities in the New York district for the Selas Co., Philadelphia, consulting and manufacturing gas engineer. He has had many years' experience in the fields of process heating and combustion, having been sales manager of the furnace department of Carborundum Co., eastern representative for the Electric Furnace Co., and eastern manager of Tate-Jones & Co. Inc.

♦ ♦ ♦

George Bean, general manager of the New Britain, Conn., plant of Eastern Malleable Iron Co., Naugatuck, Conn., has been appointed director of sales for the company, following closing of the company's plants in New Britain, Bridgeport, Conn., and Troy, N. Y., and transfer of these operations to present plants in Union City (Naugatuck), and Wilmington, Del.

T. Rice Davis, former general manager of the Bridgeport plant, has been named director of manufacturing.

Emil Mannweiler, for several years general manager of the Naugatuck plant, is now director of special products.

Paul B. Allen

Who as noted in STEEL for April 29 has been appointed general sales manager of the Otis Steel Co., Cleveland. For 12 years he has been district sales manager for Otis at Detroit

James L. Linsley, former purchasing agent and assistant manager of the Naugatuck plant, will become director of sales research.

♦ ♦ ♦

C. B. Schneible, recently in charge of Chicago district sales for American Foundry Equipment Co., Mishawaka, Ind., has resigned, effective May 1, to devote his entire time to the sale of the Schneible wet dust collector. His headquarters are 4755 North Crawford avenue. E. B. Rich succeeds Mr. Schneible with the American Foundry Equipment Co.

April Ingot Output Shows Slight Loss

PRODUCTION of steel ingots in April declined 7.9 per cent from March, the daily rate being 100,243 gross tons, compared with 108,873 tons in March. The percentage of capacity engaged in April was 45.28, compared with 49.18 in March, according to compilation by the American Iron and Steel institute, New York. Production in April, 1934, was at the daily rate of 115,912 gross tons. While the daily rate of output in April is the lowest since January of this year it is higher than any month in the last half of 1934. Total calculated production in April was 2,606,311 gross tons, compared with 2,830,700 gross tons in March and with 2,897,808 gross tons in April, 1934. For four months in 1935 total production was 11,013,306 gross tons; for four months in 1934 it was 9,813,593 tons. Further comparisons will be found in the table which is reproduced below.

Monthly Production—Complete for Bessemer; Open Hearth, Calculated from Reports of Companies Making 99.32 per cent

	Open Hearth		Bessemer		Total		Calculated daily production, all companies (gross tons)	Number of working days
	Gross tons	Per cent of capacity	Gross tons	Per cent of capacity	Gross tons	Per cent of capacity		
1935								
Jan.	2,594,312	49.02	239,858	34.99	2,834,170	47.42	104,969	27
Feb.	2,517,789	53.53	224,336	36.82	2,742,125	51.61	114,255	24
Mar.	2,599,890	51.02	230,810	34.97	2,830,700	49.18	108,873	26
Apr.	2,374,395	46.59	231,916	35.14	2,606,311	45.28	100,243	26
4 mo.	10,086,386	50.04	926,920	35.48	11,013,306	48.37	107,085	103
1934								
Jan.	1,798,698	34.20	172,489	25.17	1,971,187	33.16	73,007	27
Feb.	2,007,287	42.93	175,873	28.87	2,183,160	41.31	90,965	24
Mar.	2,557,534	48.63	203,904	29.75	2,761,438	46.45	102,275	27
Apr.	2,640,326	54.22	257,482	40.57	2,897,808	52.64	115,912	25
4 mo.	9,003,845	44.99	809,748	31.09	9,813,593	43.39	95,539	103
May	3,021,168	57.44	331,620	48.38	3,352,788	56.40	124,177	27
June	2,733,571	53.97	282,592	42.81	3,016,163	52.68	116,006	26
July	1,352,932	27.73	119,869	18.89	1,472,801	26.76	58,912	25
Aug.	1,253,972	23.84	109,598	15.99	1,363,570	22.94	50,503	27
Sept.	1,134,127	23.29	117,580	18.53	1,251,707	22.74	50,068	25
Oct.	1,334,298	25.37	127,789	18.64	1,462,087	24.59	54,151	27
Nov.	1,457,206	28.77	132,059	20.01	1,589,265	27.76	61,126	26
Dec.	1,810,139	37.17	131,456	20.71	1,941,595	35.27	77,664	25
Total	23,101,258	38.13	2,162,311	27.39	25,263,569	36.89	81,233	311

Capacity percentages for 1935 are based upon open-hearth capacity of 60,954,717 tons and bessemer of 7,895,000 tons on Dec. 31, 1934; for 1934 based on open-hearth capacity of 60,583,813 tons and bessemer of 7,895,000 tons on Dec. 31, 1933

EDITORIAL

Now Is Time To Watch Price Movements Closely

BUYERS and sellers of iron and steel face unusual complications in regard to prices. The prospect is so cluttered up with "ifs" and "ands" that one can do little better than to speculate as to which of several influences will dominate price in the next few months.

Much depends upon the final form of the legislation providing for the extending of NIRA. If Senator Clark's resolution prevails, price control will be limited to "mineral natural-resource industries in which prices are now fixed pursuant to the provisions of any code." Whether the iron and steel codes could qualify under this definition would depend upon government interpretation. Nevertheless, the temper of the senate, as displayed thus far in the discussions on NIRA, is distinctly against price control in any form.

Under the existing provisions of the steel code, producers will have to file prices for third-quarter delivery on May 22. This will enable them to start booking orders on June 1. If no change in NIRA is indicated between now and the date of filing, producers probably will post schedules either continuing, or in some cases increasing, the quotations which prevailed on second-quarter business. At this writing, sentiment seems to favor existing or higher prices rather than reductions.

On the other hand, if congress should extend NIRA in such manner that the price-filing feature of the steel code would be eliminated, or if it should allow NIRA to expire on June 16, then a price situation of an entirely different aspect would develop.

Return to Free Play of Law of Supply and Demand Would Entail Lower Prices at First

Presumably the present regulations would obtain until the expiration of the code, after which the pricing of steel would respond more or less freely to the law of supply and demand. Complete freedom would not be achieved because certain restrictions, such as artifically pegged wage rates, arbitrary freight tariffs, etc. still would be in effect.

Under these conditions, prices undoubtedly would drop. Absolute freedom of price movement probably would erase in a few days much of the system which endured through 21 months of strict code compliance. The fact that the higher costs of production seem to justify a corresponding level of prices would be forgotten momentarily. Also, the knowledge that sellers still are not making satisfactory profits would have little influence in determining prices. In brief, to remove restraint suddenly—and particularly in a buyers' market—almost inevitably would precipitate such sharp price competition that the initial reaction would be a sharp cut in prices.

Unless too many restrictions existed in consuming fields, the lower prices would stimulate demand and in the course of time prices, after finding a solid bottom, would stiffen and gradually work upward in unison with increasing tonnage.

Possibility of Some Form of Inflation Injects Third Complication Into Price Outlook

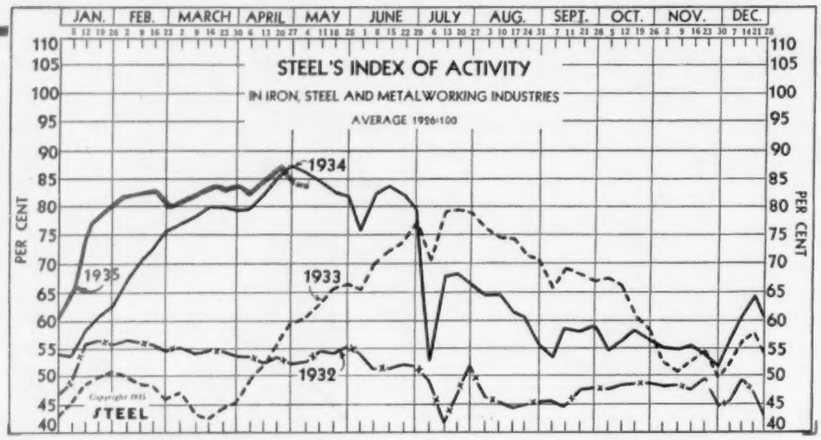
This is the standard formula, which has obtained time and time again under normal conditions in the past. Whether it would work as well now, if the codes were abandoned, would depend largely upon the extent to which other external factors interfered with the natural law of supply and demand.

But still another "if" must be considered. The seeds of several kinds of inflation have been sown so widely that there is an ever-present danger that the nation suddenly will awake to find an inflationary movement in full bloom Many experts discount the immediate danger of this development on the ground that the nation's tremendous surplus of productive capacity will automatically prevent markets from developing to the runaway stage. On the other hand, the bubble that could develop from printing press inflation is so potentially dangerous that one hates to think of its dire consequences. But if inflation, in one form or another, should get a firm grip on the country, the price trend would be forced sharply upward.

Thus consumers are confronted with three possibilities. The code may be continued as is, with steady or slightly higher prices; the price control features may be abandoned, in which case prices would dip, touch a firm bottom and rise gradually; or inflation may strike, with startling price advances in its wake.

With such widely different alternatives in prospect, buyers of steel should study the market reports in the next few months more attentively than ever before.

THE BUSINESS TREND



STEEL'S *index of activity in the iron, steel and metalworking industries declined* 0.4 *points to* 84.5 *in the week ending May* 4:

Week ending	1935	1934	1933	1932
Mar. 9	82.0	78.6	43.4	54.8
Mar 16	84.0	79.9	42.7	54.4
Mar. 23	84.0	79.7	44.6	53.5
Mar. 30	8.3	79.3	45.2	53.4
April 6	83.4	79.6	49.1	52.6
April 13	85.4	82.2	52.6	53.4
April 20	26.3	85.0	55.8	52.3
April 27	84.9†	87.5	59.5	52.5
May 4	84.5*	86.0	60.3	54.7

†Revised. *Preliminary.

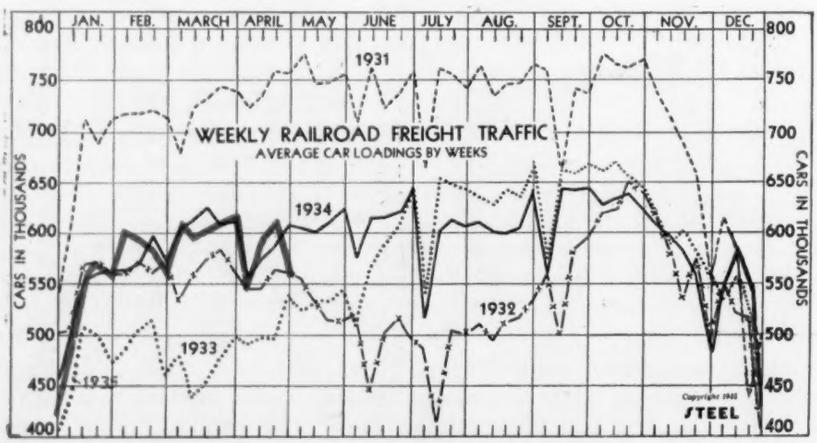
The index charted above is based upon freight car loadings, electric power output, automobile assemblies (estimated by Cram's Reports) and the steelworks operating rate (estimated by STEEL). *Average for* 1926 *equals* 100, *weighted as follows: Steel rate* 40, *and car loadings power output and auto assemblies each* 20.

Business Faces Anti-Recovery And Inflationary Forces

INDUSTRIAL activity remains fairly steady, but behind the scenes a contest for supremacy is being waged between the retarding influences of strikes and other artificial obstacles to recovery on one side and the inflationary forces of bonus legislation, extravagant federal expenditures, etc., on the other.

Thus business is caught between two sinister threats. The labor trouble, which at this writing seems to be nearing a temporary settlement, has checked operations noticeably in several important industries. The inflationary influences, which would stimulate volume and prices on a short term basis, in the long run almost inevitably would send business into a sickening tailspin. From the long range viewpoint industry can afford to buck the annoyance of occasional strikes and other political hurdles better than it can stand the final consequences of a runaway inflationary movement.

The Toledo affair was reflected slightly in the business records for the week ending May 4. Automobile assemblies were checked only to the extent of several hundred cars. Steelworks operations, which are sensitive to automobile demand, were down 2 points. Electric power output was up slightly and revenue freight car loadings gained modestly from the previous week. STEEL'S index dropped fractionally in response to these changes and now stands at 84.5.



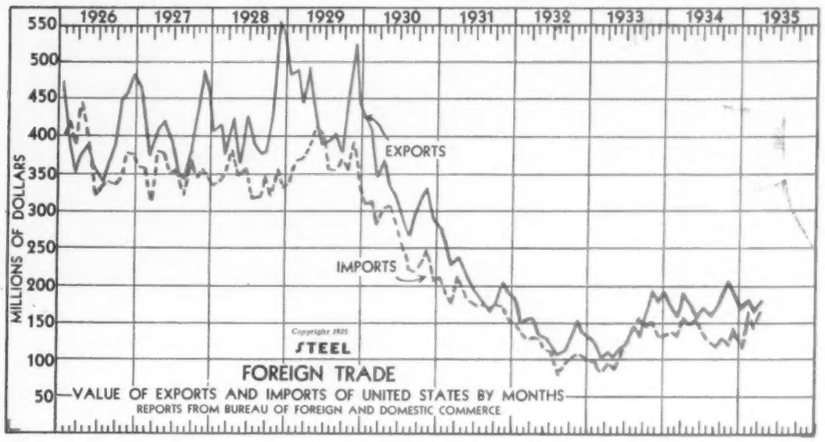
1935	
Apr. 27	558,886
Apr. 20	610,905
Apr. 13	587,685
Apr. 6	545,627
Mar. 30	617,485
Mar. 23	607,780
Mar. 16	597,432
Mar. 9	587,270
Mar. 2	604,642
Feb. 23	552,896
Feb. 16	581,981

1934	
Apr. 28	609,704
Apr. 21	591,705
Mar. 31	610,190
Mar. 24	610,038
Mar. 17	627,549
Mar. 10	614,120
Mar. 3	605,717
Feb. 24	574,908
Feb. 17	600,268

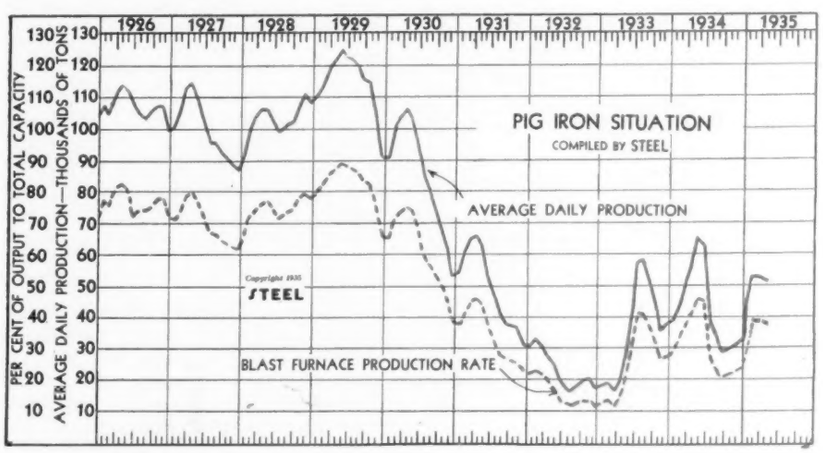
Merchandise Exports Rise; Imports Highest in 4 Years

Millions of Dollars

	1935		1934	
	Exports	Imports	Exports	Imports
Jan.	176,223	166,993	169,531	128,536
Feb.	163,006	152,537	159,671	125,292
March	185,001	177,279	190,000	158,000
April	.....	.....	176,499	141,137
May	.....	.....	160,207	154,647
June	.....	.....	167,957	135,048
July	.....	.....	161,787	127,342
Aug.	.....	.....	171,965	119,516
Sept.	.....	.....	191,690	131,659
Oct.	.....	.....	203,622	137,859
Nov.	.....	.....	194,909	150,919
Dec.	.....	.....	170,676	132,252



April Iron Production Down; Stack Total Unchanged

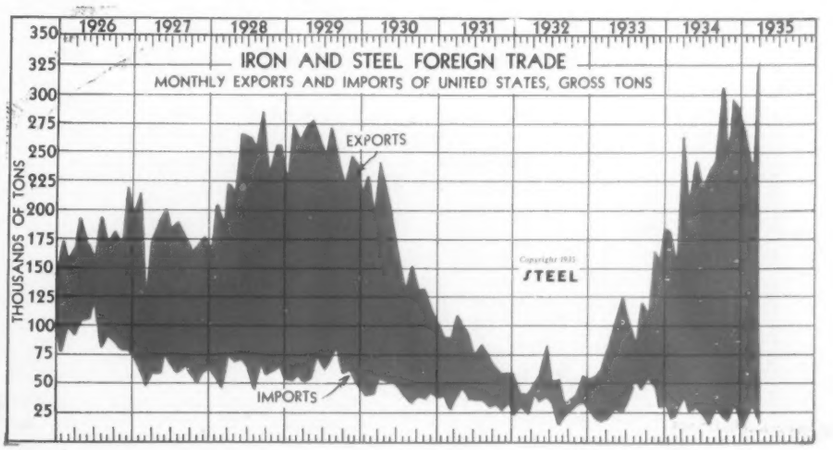


	Daily Average		Blast Furnace Rate	
	1935	1934	1935	1934
Jan.	47,692	39,537	34.2	28.3
Feb.	57,686	45,385	41.4	32.5
Mar.	57,120	52,438	41.0	37.5
Apr.	55,710	57,873	40.0	41.4
May	.....	66,370	.....	47.5
June	.....	64,563	.....	46.3
July	.....	39,630	.....	28.4
Aug.	.....	34,199	.....	24.5
Sept.	.....	29,969	.....	21.5
Oct.	.....	30,689	.....	22.1
Nov.	.....	31,930	.....	22.8
Dec.	.....	33,161	.....	23.7

Steel Export Trade Highest Since 1921; Imports Down

Gross Tons

	1935		1934	
	Imports	Exports	Imports	Exports
Jan.	22,784	262,740	22,653	178,023
Feb.	28,905	228,537	25,407	151,184
Mar.	21,409	323,035	38,393	261,260
April	.....	.....	26,862	201,539
May	.....	.....	29,465	241,753
June	.....	.....	24,848	219,406
July	.....	.....	17,676	233,186
Aug.	.....	.....	32,418	242,947
Sept.	.....	.....	23,847	301,330
Oct.	.....	.....	20,202	220,209
Nov.	.....	.....	35,272	299,263
Dec.	.....	.....	19,708	282,655
Total	.....	.....	316,761	2,832,764



Developments in Cast Steels Meet Demands

BY A. N. CONNARROE
National Malleable & Steel Castings Co.

THE accompanying article constitutes a major portion of a paper presented in Chicago, March 18, at a meeting on "Engineering Uses of Modern Cast Metals" sponsored jointly by the Chicago section of the American Foundrymen's association, Western Society of Engineers, and the Chicago section of the American Society of Mechanical Engineers. The author, A. N. Connarroe, is metallurgist, National Malleable & Steel Castings Co., Melrose Park, Ill.

MANUFACTURERS and consumers must have some common ground for discussion of purchased materials, therefore, it has come to be the practice to offer specifications on which these purchases are based. These specifications have been drawn always with the object of being close enough to protect purchasers but flexible enough to include unavoidable variables of manufacturing practice. Manifestly, new developments in manufacturing practice must precede new specifications and this has been the course in the steel castings industry.

This article will point out some of the highlights in these developments.

Since it is desirable that specified values of any desired composition should cause no undue hardship upon the manufacturer while satisfying the customer, conservative values will be used throughout, actual experimental values being used for purposes of illustration only and not for purposes of specification.

Previous to the World war little had been done about setting up standards for steel castings, many of the carbon steel compositions being used in the as-cast condition or with a simple anneal. During and after the war, increased demand for better and stronger construction materials created activity in the study and improvement of older compositions and a search for new ones. These studies resulted in inquiries into all the factors involved in the production of better and stronger castings. As a result of these studies, closer limits were established and a great variety of alloy compositions and heat treatments came into being.

In discussing heat treatments it would be well to recall that steel is a crystalline material, obeying the laws of crystal formation, even if it does not show the well defined structures associated with mineral crystallization due to the fact that the crystals, being formed as the metal solidifies, mutually interfere and set up irregular forms, exhibiting the cleavage planes of true crystals. These forms, when cut, show as irregular plane figures of various sizes, the predominant size determining the so-called parent or inherent grain size. Since steel, which has just solidified, is in the austenitic state, a homogeneous solid solution of carbon or iron carbide in gamma iron, this is spoken of as inherent austenite grain size. This grain size seems to exert a profound influence upon the results of subsequent treatments.

Upon further slow cooling, a transformation of part of the gamma to alpha iron takes place and the excess constituent begins to separate, the temperature of separation being controlled by the composition and

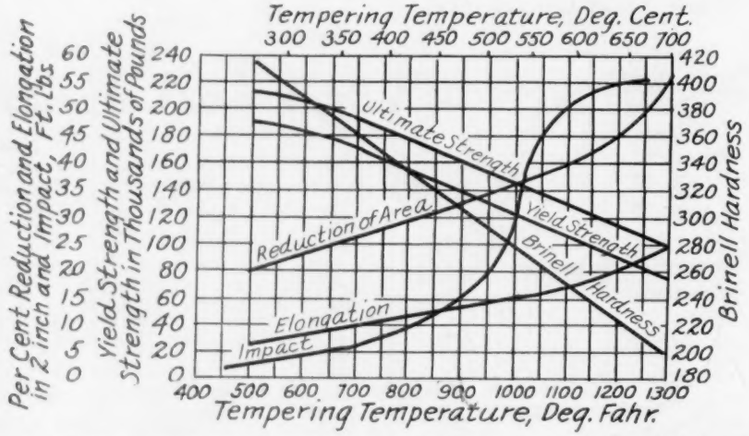

Tempering Temperature, Deg. Cent.
300 350 400 450 500 550 600 650 700
Per Cent Reduction and Elongation in 2 inch and Impact, Ft. Lbs.
Yield Strength and Ultimate Strength in Thousands of Pounds
Brinell Hardness
Ultimate Strength
Reduction of Area
Yield Strength
Brinell Hardness
Elongation
Impact
400 500 600 700 800 900 1000 1100 1200 1300
Tempering Temperature, Deg. Fahr.

Fig. 1—Physical properties of manganese-molybdenum cast steel containing 0.30 carbon, 1.25 manganese and 0.30 per cent molybdenum, water quenched and drawn at different temperatures

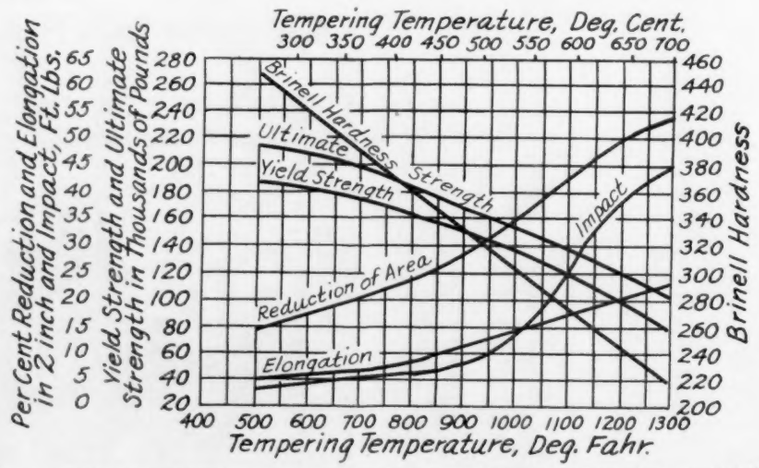

Tempering Temperature, Deg. Cent.
300 350 400 450 500 550 600 650 700
Per Cent Reduction and Elongation in 2 inch and Impact, Ft. Lbs.
Yield Strength and Ultimate Strength in Thousands of Pounds
Brinell Hardness
Brinell Hardness
Ultimate Strength
Yield Strength
Impact
Reduction of Area
Elongation
400 500 600 700 800 900 1000 1100 1200 1300
Tempering Temperature, Deg. Fahr.

Fig. 2—Physical properties of chrome-nickel-molybdenum cast steel containing 0.30 carbon, 2.00 nickel, 0.80 chromium and 0.20 per cent molybdenum, water quenched and drawn at different temperatures

# of Service

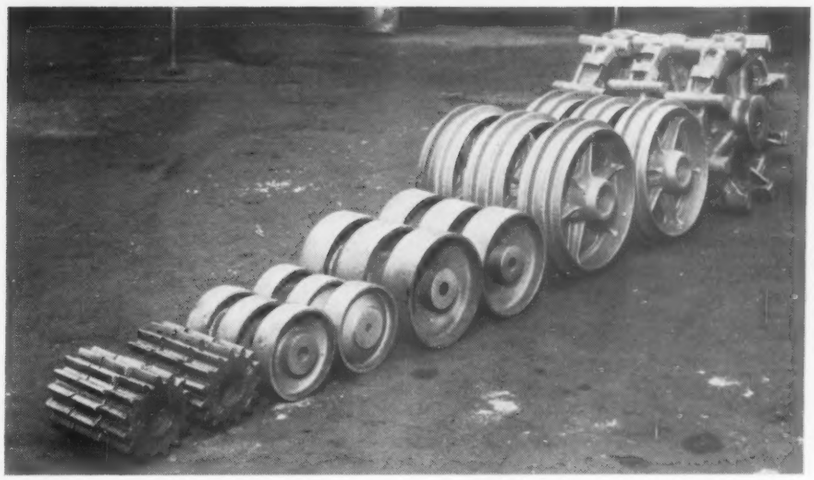


Fig. 3—A group of differentially quenched and tempered alloy steel castings which meet severe service requirements. Gear teeth, rims and projections are given varying degrees of hardness

rate of cooling. When a certain point is reached, the remaining gamma iron is changed into ferrite and iron carbide is precipitated simultaneously, resulting in a structure called pearlite. The points at which these changes take place are called transformation or critical points.

Reheating the material produces the opposite effect, the temperatures on heating at which changes take place being higher than on cooling. When the temperature is reached at which the austenitic transformation begins, minute austenite crystals start to form within the pearlite or at the ferrite grain boundaries and grow across to meet each other. When the material is entirely austenitic, a new set of grain sizes will have been established. These grains are fairly stable and can grow only at the expense of one another, so that any further growth requires a still higher temperature, known as the coarsening temperature. Upon recooling, the transformations occur again in these newly formed grains and the crystalline structure of the material is that established by this reheating and cooling.

Heat treatment rings the changes on the transformation cycle and the physical properties of steel castings are controlled by three factors—grain size, the degree of supercooling of the austenite previous to its transformation, and the composition of the deposited ferrite.

Heat treatments are defined as follows:

Full Annealing consists of heating above the critical temperature range and holding a proper period of time followed by slow cooling through that range.

Normalizing consists of heating above the critical temperature range and holding a proper period of time followed by a cooling below that range in still air.

Liquid Quenching consists of heating above the critical temperature range, holding above that range for a proper period of time, followed by a rapid cooling to a temperature below that range by immersion in a liquid cooling medium.

Differential Liquid Quenching is carried out in such a manner that only the desired portion of the material is subjected to the rapid cooling of a liquid quench.

Tempering or Drawing consists of reheating after normalizing or quenching to some temperature below the critical temperature range, followed by any desired rate of cooling.

The effect of various alloys on the supercooling and transformation rate and the grain size of the austenite offers their advantage in the production of material to meet a predetermined specification. Some of these alloys dissolve in the ferrite matrix to give it additional strength while others form carbides and influence the transformation of the austenite.

Studies by Reed have shown that the effectiveness of alloys in displacing the eutectoid point in pure iron-carbon bases, containing from 0.40 to 0.80 per cent carbon, arranges the alloying elements in the following order: Vanadium, manganese, chromium, molybdenum, tungsten, and nickel.

Vanadium is a good scavenger and tends to make a cleaner steel. However, its power as a carbide former is its chief function as an alloying agent. The finely divided carbides and possibly oxides exert an intense inhibition upon the grain growth of the steel, probably due to resistance to the migration of the rejected ferrite, thus setting up numerous nuclei for a new grain growth, resulting in a fine-grained structure.

Advantages of Manganese

Manganese is one of the most powerful carbide formers used in steels. While its chief function is its use as a deoxidizer and sulphur stabilizer, larger proportions perform an alloying action, which contributes much to the properties of the metal. The effect of the manganese carbide on the super-cooling of the austenite, together with the small solubility of manganese in the ferrite matrix, exerts a powerful effect upon the hardenability of steels. The addition of a small amount of vanadium or molybdenum helps to prevent the inherent tendency of manganese steels to develop a large grain structure and improves the impact strength of the material.

Chromium is most effective as a hardening agent when there is sufficient carbon present to form carbides, which influence the split transformation of the austenite. Binary chromium steels have a tendency to be brittle in the ordinary range of carbon and are improved when alloyed with nickel in about the ratio of 2½ parts of nickel to 1 of chromium, the nickel exerting a toughening effect upon the

Table I

Physical Properties of Carbon Steel Castings

Carbon Content—0.30 Per Cent

	As Cast	Annealed	Heat Treated
Tensile strength, lbs. per sq. in.	74,100	75,000	80,000-125,000
Yield point, lbs. per sq. in.	37,100	41,500	50,000- 97,000
Elongation in 2 inches, per cent	19.5	24.5	30.0-10.0
Reduction of area, per cent	31.0	46.2	65.0-20.0
Brinell hardness	160	145	155-250
Izod, foot-pounds	16	20	48-15
Endurance ratio	0.40	0.44	0.50

Table II

Cast Alloy Steels—Normalized and Drawn at 1250 Degrees Fahr.

Kind	C.	Mn.	Si.	Ni.	V.	Mo.	Cr.	Tensile strength, lbs./sq. in.	Yield point, lbs./sq. in.	Elongation in 2 in.,	Reduction of area,
	Per cent									Per cent	
Ni.-V.	0.26	0.97	0.30	1.54	0.11	.....	.....	90,000	60,500	25.5	50.9
Ni.-Mn.	0.32	1.10	0.31	1.10	.....	.....	.....	90,400	63,250	25.0	40.0
Ni.-Mo.	0.33	0.70	.....	1.37	.....	0.33	.....	91,045	60,536	24.8	54.4
Mn.-Mo.	0.35	1.35	.....	.....	.....	0.35	.....	96,000	68,000	25.5	51.5
Ni.-Cr.	0.35	0.80	0.40	1.30	.....	.....	0.94	102,000	67,400	21.0	41.0
Cr.-Mo.	0.39	0.81	.....	.....	.....	0.43	0.69	103,000	73,000	19.0	40.0
Ni.-Cr.-Mo.	0.35	0.85	.....	1.75	.....	0.35	0.75	118,000	90,000	18.0	35.1
Mn.-Cr.-Ni.-Mo.	0.34	1.58	.....	1.22	.....	0.32	0.71	125,000	92,000	22.7	51.2

ferrite. This combination gives a deep hardening steel, which is useful where heavy sections are encountered.

Molybdenum exerts a powerful influence upon the transformation points of steel, especially when used with some of the other alloying elements. Deep hardening qualities are produced, which require higher drawing temperatures to develop ductility. This promotes the relief of internal strains and renders the material less liable to rupture under sudden stress.

Tungsten has but little influence upon the mechanical properties of mild steels when present in amounts below 1 per cent. In larger amounts, it is a carbide former when enough carbon is present for the reaction.

Nickel exerts a depressing effect upon the critical points, on cooling, through its alloying with ferrite to produce a fine grained product. Thus it is classed as a toughening agent since the solid solution in the ferrite resists the migration of the carbides during the austenitic transformation.

First Move to Standardize

The great variety of compositions resulting from studies of the alloying elements led to attempts to exploit various privately sponsored products, thus were developed many different requirements for the same material. This resulted finally in the appointment of a committee by the American Society for Testing Materials for the correlation of data and establishment of more uniform specifications.

By 1930 there were four carbon steel casting specifications, known as miscellaneous (A 27-24), railroad (A 87-27), high temperature valves (A 95-29), and stud link chain (A 77-28 T) and one alloy steel specification, Hadfield's austenitic manganese steel (A 128-30 T). In 1933 the A.S.T.M. adopted a specification as a tentative standard, entitled (A 154-33 T), "Carbon Steel Castings for Industrial, Railroad and Marine Uses." The new tentative specification for alloy steel castings was adopted in June, 1933, and is known as A 148-33 T, "Alloy Steel Castings for Structural Purposes."

Specifications Reviewed Previously

(A.S.T.M. specifications A 148-33 T and A 154-33 T were presented and discussed in considerable detail in an article, "Recent Progress in Drafting A.S.T.M. Specifications for Steel Castings", by R. A. Bull, appearing in the Oct. 2 and Oct. 9, 1933, issues of STEEL—EDITOR.)

Combinations of alloys mutually benefit one another and, when properly chosen, may result in a cheaper alloy with superior qualities. The fact is illustrated by the wide use of molybdenum since the war to supplement and partially replace other alloys.

Full annealing of carbon steel castings renders them more ductile and relieves cooling strains making them more resistant to shock. Normalizing and drawing raises the static strength of plain carbon steel castings and helps the impact resistance to a greater degree. Highest static and dynamic strengths are obtainable by suitable liquid quenching and drawing. By this means the elastic limit is increased about 45 per cent over the annealed condition, the ultimate strength about 25 per cent and the impact value about 100 per cent. Typical values obtainable are shown in Table 1. Many intricate carbon steel castings now are being liquid quenched without undue cracking and warpage, thus affording a cheap high-strength material for moderately severe service.

Since but a small part of the latent strength of alloy steel castings is obtainable by full annealing, most of these castings are used in the normalized and drawn condition or the liquid quenched and drawn condition. Various combinations are used to meet the requirements of each particular case. In making these combinations the resultant effect of the various alloys is produced, the one intensifying or ameliorating the influence of the others.

Combination of Alloys

A widely-used combination consists of nickel, chromium and molybdenum, with carbon ranging from 0.20 to 0.40 per cent, the amount of the alloying elements decreasing in order. Where chromium steels tend to form columnar grain structures, the addition of about 1 part nitrogen to 100 parts chromium makes them fine grained. Table II shows results which are being obtained with some combinations with a simple heat treatment. Liquid quenching and

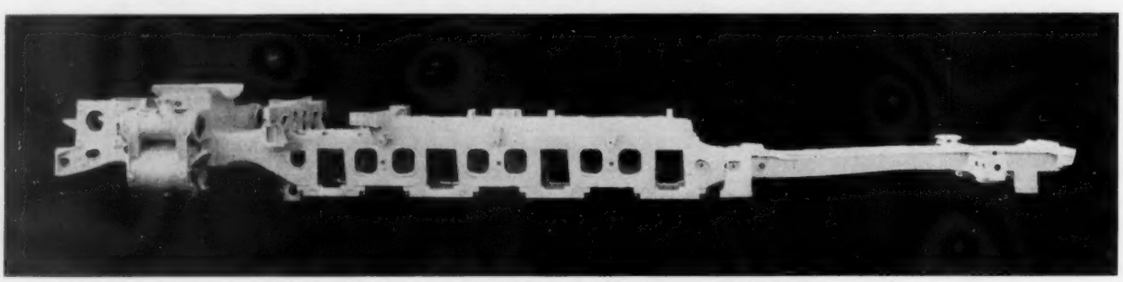


Fig. 4—This one-piece cast alloy steel locomotive frame resists fatigue and shock stresses in a very severe type of service. It is an excellent example of size and complexity produced through ingenuity of the designing engineer and the foundryman

drawing would give a wider range of physical qualities with each of them. No attempt has been made to arrange these compositions to fit the various classes, but they represent values which have been obtained in commercial practice and demonstrate how a variety of combinations can meet the same requirements.

Fig. 1 shows results obtainable from a 0.30 per cent carbon, 1.25 per cent manganese, 0.30 per cent molybdenum steel, water quenched and drawn at different temperatures. The excellent values obtainable with this composition when tempered at about 1000 degrees Fahr. are shown in this chart. Fig. 2 shows the result of water quenching a 0.30 per cent carbon, 2.00 per cent nickel, 0.80 per cent chromium, 0.20 per cent molybdenum steel. Again the variations in qualities obtainable by proper tempering are brought out.

It is evident from a study of these two charts that one alloy combination may be made to fit into all three classes of the A.S.T.M. tentative alloy steel specifications (A 148-33 T). Where sections are heavy and the castings do not lend themselves to rapid cooling, it may be difficult to reach the specification of Class C.

The rapid rise in impact values obtainable where the alloy composition and heat treatment produce a fine grained structure is noticeable. Impact testing has not been standardized sufficiently to use as a specification but is very valuable in the study and development of alloy combinations and heat treatments. The fact that carbon steels fall rapidly in resistance to impact at low temperatures is well known and alloy combinations are being used for service in cold climates very successfully.

Because of their high yield strength, steel castings can be used to replace structural members very successfully with a material saving in weight for the same conditions of service or the loads may be increased for the same size of section, when properly designed.

Castings should not be designed primarily for esthetic appeal but with a view to strength and reliability in service. After values obtainable with different combinations and heat treatments are studied, the section should be designed from a standpoint of ease of castability in the foundry. This will lead to greater savings to both producers and consumer and insures a satisfactory product.

An early example of the substitution of cast steel for forged material was the development of anchor chain during the World war. The reliability of producing a link of constant size and shape and the increased proof strength was an achievement brought on by the force of necessity.

Severe service demands have led to the practice of differentially quenching and tempering castings. By use of proper quenching fixtures and methods a marked difference in hardness may be attained in the different sections of the casting so that wearing parts are hard while the rest is in machinable condition. Fig. 3 shows castings which are being differentially quenched successfully.

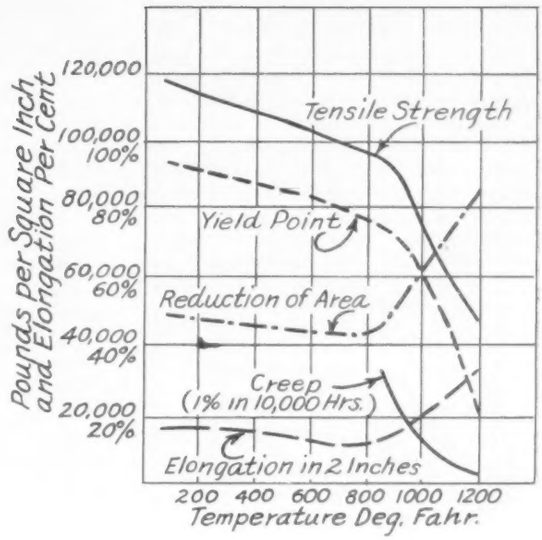


FIG. 5 — Tensile tests and creep characteristics of a cast steel containing 4.00 to 6.50 per cent chromium and 0.50 per cent molybdenum

Table III

Specification for Steel Castings for Hot Oil Service

Chemical Analysis

	Per cent
Carbon	0.15-0.35
Manganese	0.45-0.85
Silicon	0.20-0.60
Chromium	4.00-6.50
Molybdenum	0.40-0.65
or	
Tungsten	0.80-1.25
Phosphorus	0.05 max.
Sulphur	0.05 max.

Physical Properties

	Min.
Tensile strength, lbs. per sq. in.	110,000
Yield point, lbs. per sq. in.	75,000
Elongation in 2 inches, per cent	18.0
Reduction of area, per cent	30.0

Castings of Unusual Size

An example of the possibility of substituting integral castings for fabricated structures is shown in the cast locomotive frame, Fig. 4. Through the ingenuity of the designing engineer and the foundryman a thoroughly reliable casting has been produced, which resists the fatigue and shock stresses of a very severe type of service. In this connection, however, it is well to state that attempts to carry size and com-

Table IV

Tensile Tests on Cast Steel for Hot Oil Service

C.	Si.	Mn.	S.	P.	Cr.	Ni.	Mo.	Yield point, lbs./sq. in.	Tensile strength, lbs./sq. in.	Elongation in 2 in., Per cent	Reduction of area, Per cent
0.25	0.29	0.63	0.026	0.025	4.74	.....	0.40	80,870	111,015	20.5	52.7
0.29	0.32	0.80	0.020	0.029	4.82	.....	0.48	87,816	111,519	20.0	45.3
0.25	0.40	0.46	0.023	0.020	4.92	0.76	0.48	84,700	112,900	20.0	39.3
0.42	0.37	0.61	0.017	0.021	0.91	2.00	0.49	95,108	121,121	18.0	40.7

plexity too far may lead to serious difficulties.

Where shape and size of castings permit, the centrifugal casting process offers the special advantage of producing a dense material which yields readily to subsequent heat treatment with superior physical properties. Cast steel gun blanks are being made by this process and have shown good results. Centrifugally cast steel car wheels do not develop a dendritic structure on the tread and thus promote better wearing qualities.

Steels for Special Service

Where cast steels are subjected to moderately high temperatures and mild corrosion, the 4 to 7 per cent chromium composition is used. The addition of titanium reduces the tendency to air harden and renders the castings more resistant to oxidation at elevated temperatures. Development of high-nitrogen ferrochromium for the introduction of nitrogen into high-chromium steel castings has broadened the field for these castings. The nitrogen produces considerable grain refinement and reduces the tendency toward excessive grain growth at high temperatures. Addition of 0.50 per cent molybdenum inhibits brittleness and aids corrosion resistance.

Table III shows a typical specification under which castings of the 4.00 to 6.50 per cent chromium range are being produced for hot oil service. The finished castings are to be tested to four times the working pressure specified. Table IV shows some of the combinations and tests meeting the previous specifications. The last line in Table IV shows that where corrosion is not an important feature high physical qualities can be produced by increasing the nickel and carbon and lowering the chromium content.

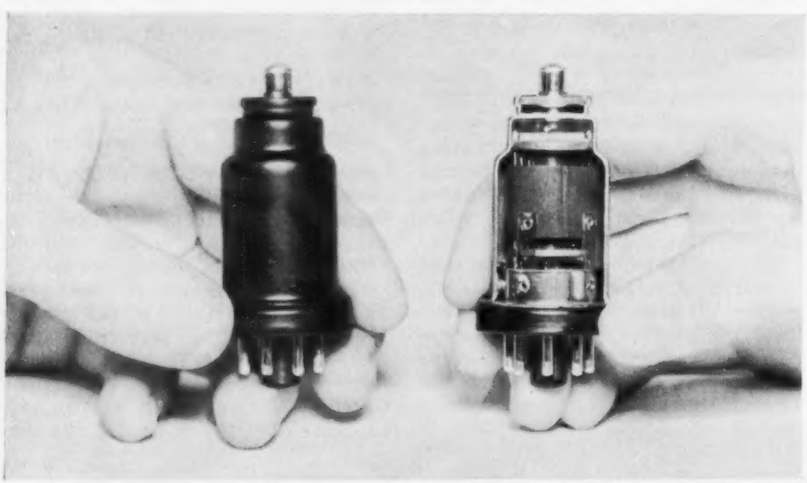
Fig. 5 shows the results of quick tensile tests at various temperature as well as creep characteristics of the 4.00 to 6.50 per cent chromium, 0.50 per cent molybdenum steels.

For high temperature work, 15 per cent chromium is about the minimum composition, while the higher temperatures require about 30 per cent chromium to resist oxidation. The presence of silicon and aluminum aids in resisting hot oxygen. The 18 per cent chromium alloys are used for nitric acid plant equipment, steam valves and castings for moderate temperatures and low stresses. The 28 per cent chromium alloys are used for annealing boxes, lead pots, pump and valve bodies, and sulphur-rich atmospheres at high temperatures. The 18 per cent chromium, 8 per cent nickel alloys are used for paper mills, dairies, oil refineries, manufacturers of food stuffs, and ornamental purposes. The 29 per cent chromium, 9 per cent nickel is used for roasting furnace rabble arms, refinery pump parts, and to resist oxidizing acids. The 16 per cent chromium, 36 per cent nickel is used for carburizing containers, grids, chains, rollers, and rails for heat treating furnaces and other high temperature work free from sulphur-rich gases.

At high temperatures the creep resistance of these compositions is low but the ductility is high. Nickel converts ferritic chrome iron alloys into the austenitic condition and adds strength and toughness. Carbide precipitation can be prevented in the 18 per cent chromium, 8 per cent nickel composition by keeping the carbon below 0.07 per cent, or stabilizing with titanium or columbium.

Since there are about 250 privately sponsored analyses of corrosion and heat-resisting castings, it is well to consult with a reliable manufacturer when designing castings for this type of service.

All-Metal Radio Tubes



RADIO TUBES ENCASED IN STEEL: Smaller and sturdier, this new line of metal radio tubes has been developed in laboratories of the General Electric Co., Schenectady, N. Y. They are claimed to offer improved electrical characteristics, to provide their own shielding through the steel shell, and to be better heat conductors and radiators than glass tubes. They are not interchangeable with glass tubes. In assembly the inner parts of the tube are attached to the steel end plate or header and the low-carbon steel shell placed over the elements and spot welded around its lower circumference, after the interior has been evacuated. Each lead-in wire passes through a small bead of special glass that is fused securely within an alloy eyelet which in turn is welded to the metal container. The alloy eyelet is of Fernico, a combination of iron, nickel and cobalt with about the same coefficient of expansion as glass. An extra base pin is required to ground the metal shell

Stainless Steel Book in New Edition, Much Revised

The Book of Stainless Steels, second edition, by Ernest E. Thum; cloth, 787 pages, 6 x 9 inches; published by American Society for Metals; supplied by STEEL, Cleveland, for $5, plus 15 cents for postage; in Europe by Penton Publishing Co. Ltd., Caxton House, Westminster, London.

Since the first edition of this work went out of print constant demand has been experienced for another edition and the present volume is the result. However, so rapidly has development in the field of stainless steels proceeded that revisions have affected practically every page of the second edition. No less than 27 chapters have been rewritten or are entirely new and 168 pages have been added to the number in the first edition.

It covers corrosion-resisting and heat-resisting chromium alloys, is a co-operative undertaking by public spirited engineers and institutions, primarily to present information on fabrication, properties and utilization to consumers of these alloys.

Among the new material is a chapter, 7-C, on arc welding of high-chromium irons, by J. C. Hodge; several chapters on various types of castings, by A. C. Jones; chapter 15-A on 29 per cent chromium, 9 per cent nickel, by R. J. Wilcox; chapter 18-A on requirements of petroleum refineries, by E. S. Dixon; index of trade named alloys, by C. E. Plummer.

A list of manufacturers of these alloys and a general index complete the volume.

Simplified practice recommendation R45-32 on grinding wheels, first effective in 1926 and since revised, has been reaffirmed for another year.

Urges Stress Relief for All Welded Pressure Vessels

BY DR. D. S. JACOBUS
President, American Welding Society

NO SUBJECT bearing on the construction of fusion welded pressure vessels prompts such a wide variation of opinion as the conditions which make it necessary to stress relieve the joints. The A. S. M. E. code requires that the stresses be relieved in certain cases by heating uniformly to at least 1100 degrees Fahr. and up to 1200 degrees or higher if this can be done without distortion, and holding the vessels at that temperature for a period of time proportioned on the basis of at least 1 hour per inch of thickness. The code covers the welding of plain carbon steels in which the carbon content does not exceed 0.35 per cent. All welded drums for power boilers and all pressure vessels employed in the most dangerous service are required to be stress relieved, but the Unfired Pressure Vessel code sanctions the use of quite a wide range of fusion welded vessels without stress relief.

Grain Structure Not Refined

The temperature specified for stress relieving the welds does not refine the grain structure. In vessels made of alloy steel or in which the carbon limit exceeds that specified in the code, it is necessary in many cases to refine the grain adjacent to the welds by heating the vessels to above the critical temperature after welding. The remarks which follow apply to the stress relief of vessels constructed of plain carbon steel in accordance with the rules of the A. S. M. E. code. The carbon content of these steels does not exceed 0.35 per cent, consequently the remarks may not apply to vessels constructed of other grades of steel.

The A. S. M. E. Unfired Pressure Vessel code requires that unfired pressure vessels to be used under the most exacting service conditions must be stress relieved and others for a limited field of service to be stress relieved when the shell thickness for a given diameter exceeds a certain figure. Vessels of the latter class are required to be stress relieved where both the wall thickness is greater than 0.58-inch and the shell diameter less than 20 inches, and for all other wall thicknesses and shell diameters where the ratio of the diameter to the cube of the shell thickness is less than 100, and in all cases where the shell thickness is over 1½ inches.

The A. S. M. E. Unfired Pressure Vessel code sanctions the use of unfired pressure vessels of the latter class for storing gases other than those of a lethal nature. Where water or other liquid is present in the vessel, the pressure for a vessel that may be used without stress relief is limited to 400 pounds per square inch, and the temperature up to 300 degrees Fahr. The object of these limitations where the vessels contain liquids is to insure safety for types of vessels where the energy developed in the case of an explosion by the heated liquid has led to disastrous results.

The A. S. M. E. code is more liberal in its stress relief requirements than any other code of which the writer knows, for example, the specifications of the bureau of engineering of the United States navy call for stress relieving all fusion welded pressure vessels, and the tentative requirements of Lloyd's Register of Shipping for Fusion Welded Vessels Intended for Land Purposes call for heat treating all vessels subject to internal steam pressures above 50 pounds per square inch, and other vessels, depending on the service for which the vessels are intended.

THE accompanying article constitutes a paper presented in Detroit, April 17, before local sections of the American Welding society, American Society of Mechanical Engineers and American Society for Metals. The author, Dr. D. S. Jacobus, is head of the engineering department, Babcock & Wilcox Co., New York, also national president of the American Welding society.

Reason for Exemptions

One of the objects of the rule given in the A. S. M. E. boiler code was to exempt certain vessels from the requirements of stress relief where it would be impossible to stress relieve the vessels. The vessels in mind were those built in the field and having large diameters, say 30 feet or more, in which case it would be impossible to stress relieve the vessels as a whole and also in which cases there would be more flexibility than in smaller vessels of the same plate thickness.

The rule which exempts certain unfired pressure vessels from stress relief and which was finally embodied in the Unfired Pressure Vessel code was prepared jointly by the American Welding society and the Boiler Code committee. It was published in *Mechanical Engineering*, the official organ of the American Society of Mechanical Engineers, with a request that criticisms or suggestions be submitted to the committee. No criticisms or suggestions were received before including the rule in the Unfired Pressure Vessel code, whereas there has been considerable discussion as to the exactness of the rule since its inclusion and the Boiler Code committee has been requested to provide a more liberal rule.

Welding Strains Are Severe

Many investigations are in progress and much has been published on the strains and the corresponding stresses due to welding. It has been shown that welding a seam in a pressure vessel may produce elongations in the plate adjacent and at right angles to the weld which will be two or more times as great as that required to produce a stress equal to the yield strength of the material. It has been shown also that the residual strains after the welding, both at right angles and parallel to the weld, may be in the neighborhood of those corresponding to the yield strength of the plate. It is well known that in fusion welding a pressure vessel it will at times rupture due to the strains produced by the welding before the application of the hydrostatic test in the shop, all of which shows that the strains due to the fusion welding are of great magnitude. The question arises as to the effect of these strains should the vessel be placed in service without stress relief.

There is a feeling on the part of some that if a vessel is placed in service after being subjected to the usual hydrostatic tests the stresses will gradually diminish from creeping of the material and safety will result through the readjustment of the stresses, provided the welds are sound and the weld metal is of as uniform and as good quality as the plate.

Vessels tested by subjecting them to pulsating pressure have ruptured in the plate metal parallel to the weld at lower stresses than correspond to the strength of the material. It has been shown that this action may come through the stresses adjacent to the weld produced by the welding, as these stresses added to the hoop stress produced by the hydrostatic pressure may correspond to or exceed the endurance limit of

the material. For certain types of service, therefore, there would seem to be no question but that it is well to stress relieve all fusion welded vessels.

A most important feature which must be considered in deciding whether a vessel should be stress relieved is the chance that the weld will not be as uniform and strong as the parent plate. If portions of the welded joint are not thoroughly fused, experience has shown that intermittent stresses due to variations in temperature or pressure will lead to cracks starting at the unfused portions and extending to an extent that may result in danger. Stress raisers of the sort resulting from imperfections in the weld are something that must be given most serious consideration, and in case of a doubt those responsible for the formulation of safety codes naturally lean toward conservative rules.

The results obtained in long service are the best measure of safety. It is difficult, however, to formulate rules based on the service results when the art of fusion welding is advancing so rapidly and defects may be developed after many years of use. Again, the stresses depend in a great measure on the method used in welding, and many variables are involved. We must not be misled through the rapid advances that have been made in the last few years into thinking that we know all about fusion welding. As the writer has said on other occasions, he believes we have proceeded not over 25 per cent of our way and it is certainly much better to advance carefully than to make mistakes for which we may be sorry.

Progress in Structural Welding

All that has been said bears on fusion welded pressure vessels. The question naturally arises as to the use of fusion welding in other fields, such as in building, bridge and ship construction, where it would be impossible to stress relieve most of the joints. Great progress has been made in this type of welding and the record has been exceptionally clean in regard to failures in service. Therefore, we should not close our minds to providing more liberal rules for the stress relief of unfired pressure vessels if reliable information is obtained which will warrant this being done with safety.

Bursting tests of vessels under hydrostatic pressure made in the ordinary way do not give data on which to base a rule for stress relief, as the residual stresses due to the welding have little or no effect on the bursting strength, whereas tests under intermittent pressures are especially valuable for the purpose. Such tests were proposed a long time ago by the American Welding society and the Boiler Code committee in working up a series of tests to be made at the bureau of standards in Washington. The tests were designated at the time as "breathing tests" in which the vessels were to be subjected to pressures alternating from about zero to 1½ times the allowable working pressure.

These suggested tests were not made at the bureau of standards but the Babcock & Wilcox Co. pursued tests along these lines under the supervision of Prof. H. F. Moore, University of Illinois, Urbana, Ill. These tests did much in establishing the reliability of fusion welding and they are now regarded as accelerated service tests. Tests of this sort should be sufficiently inclusive, for a few tests under a given set of conditions may not solve the problem.

Difficulties in Stress Relieving

Local stress relieving, such as heating the area around a nozzle, may set up objectionably high stresses in the shell of a vessel adjacent to or around the part which has been stress relieved. Where a vessel is stress relieved in two heats, because it is too long to be accommodated in the stress relieving furnace, objectionable stresses may be set up if the temperature gradient in the portion between the heated and cooled part of the shell is too high. This feature in stress relieving a vessel in two heats was provided for in the preparation of the joint A.P.I.-A.S.M.E .code for Unfired Pressure Vessels for Petroleum Liquids and Gases, which includes the requirement that the temperature gradient for the part in question shall not exceed 200 degrees Fahr. per foot along the shell.

So many features of stress relief have not been settled that some users of pressure vessels require all vessels to be stress relieved when the wall thickness is, say, ¾-inch, or over, even though no stress relief is demanded by the A. S. M. E. code.

The writer's own company has gone to great expense in conducting researches to investigate the strains produced in fusion welding and these will be published upon completion. This work has convinced us that to obtain maximum reliability and safety all vessels should be stress relieved after welding. In our own practice, we usually stress relieve all vessels even though some are exempted from stress relief by the A. S. M .E. code.

We have much to learn on this subject and while we should be looking forward to the possibility of using more liberal rules, we should make sure not to proceed unless reliable scientific data and facts show that the revised rules will be safe.

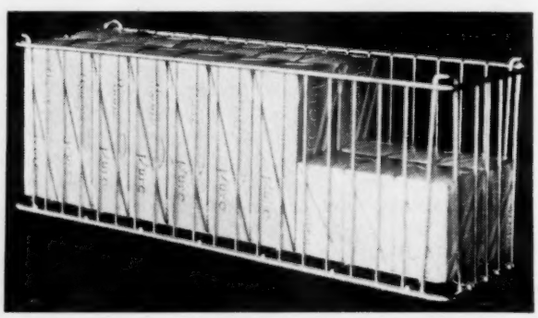
Ice Cream Hardening Trays Require Much Steel Wire

When the ice cream industry, three or four years ago, became converted to the method of marketing its product in packaged form, it found itself confronted with the need for a suitable method of hardening packaged cream.

At first, sheet metal, wood and cardboard trays were used but did not prove entirely satisfactory. The closed sides of these trays prevented rapid circulation of air refrigerated to -10 to -30 degrees Fahr., and the wood and cardboard tended to resist the transfer of heat. Further difficulty was encountered because there was some tendency for these containers, stacked one upon another, to crush.

An investigation conducted by the United Steel & Wire Co., Battle Creek, Mich., about that time, revealed that the open construction of a wire crate allowed free circulation of the refrigerated air and effected a marked reduction in the hardening time.

Provided with offset bottom, these patented trays fit into each other so that cartons are not crushed or soiled by the tray above. They are made in assorted sizes to accommodate every known and generally used ice cream container on the market. They are made of basic steel wire, No. 0 gage for the bottom frame, No. 1 for the top frame, No. 5 for the corner stacking wires and No. 9 for the sides and bottom. The wire parts are permanently assembled by electrically welding at all joints and intersections. The completed hardening cases are finished with a heavy tin plated coating.



Steel wire, joined by welding, tin plated, makes efficient trays for hardening packaged ice cream in refrigerated chambers

METHODS AND MATERIALS

Alloy Iron Is Suitable for Machine Tool Castings

Cast iron of the following analysis is being used by a large machine tool manufacturer in castings having considerable variation in section size: Total carbon, 2.75 to 3.00 per cent; silicon, 1.50 to 2.00 per cent; sulphur and phosphorus, 0.10 per cent maximum; manganese, 0.70 to 1.00 per cent; nickel, 1.30 to 1.75 per cent; chromium, 0.30 to 0.50 per cent. Steel to the extent of 70 per cent was used in the mixture. This iron has a tensile strength, heat treated, of 65,000 to 75,000 pounds per square inch; tensile strength, as cast, 50,000 to 55,000 pounds per square inch; a transverse strength as cast of 5000 to 5500 pounds per square inch; a brinell hardness of 212 to 240 in the as cast state and a brinell, heat treated, of 286 to 340.

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Graphite-Oil Paste Prevents Scaling when Gas Welding

In welding tanks for holding certain gases it is essential that scaling of the interior surfaces of the steel be prevented. One fabricator recently discovered a way of avoiding such scaling. After painting the inside of the tanks along the line of weld, with a paste mixture of flake graphite and cylinder oil, the gas weld could be made without the formation of scale.

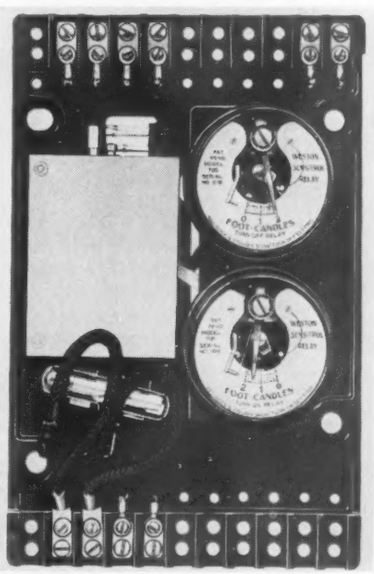
$ $ $

Handling Costs Reduced by Use of Caster Trucks

Although the plant of a Cleveland gas range manufacturer is described by the adjective "small," its assembly line is about 5 miles long. This is because of a detour of many of the range parts to a porcelain enameling plant in the same city. The parts, after fabrication in shears, punches, forming and flanging presses and other machines, are loaded into specially-built racking trucks, substantially constructed of maple and provided with heavy casters. These trucks, when loaded, are taken off the shop assembly line and transported by motor truck to the porcelain enameling plant.

After the parts have been enameled, they are reloaded into the caster trucks. The latter again are loaded on motor trucks and taken back to the range shop where they again go into the assembly line at the point where they left it. This method of bridging the gap necessitated by the enameling operation was developed only recently and the trucks are paying for themselves by materially reducing the expense of handling.

Light Guardian



NEW PHOTRONIC CONTROL which turns lights on and off automatically to maintain a predetermined level of illumination, recently announced by the Weston Electrical Instrument Co., Newark, N. J. The desired "turn on" and "turn off" points are set in advance on two independent scales, and at these values the cell actuates a relay controlling the light circuit through a mercury switch. For indoor industrial use, the light collector containing the "electric eye" is directed at the location where illumination is to be maintained, and the electric impulse it sets up is carried by ordinary leads to the panel containing relay and switch. For the relation of adequate illumination to industrial efficiency, see STEEL, *Aug. 13, Aug. 20 and Sept. 17, 1934.*

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Refractory Resists Growth In Vitreous Enamel Muffles

Electro Refractories & Alloys Corp., 62 Andrews building, Buffalo, has developed a silicon carbide refractory known as Nor-Gro, due to its ability to withstand the oxidizing conditions which occur in a vitreous enameling muffle. The company reports that installations of this refractory in vitreous enamel muffles show no sign of growth after four years of service. The resistance to growth also permits the refractory to retain its initial thermal conductivity for the reason that it does not become spongy.

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Tacks and Nails Sell More Rapidly in New Packages

Utility and saleability are two striking characteristics of completely redesigned packages and cartons in which tack products of the Republic Steel Corp., Chicago, now are packed. The tacks are packed in packages of distinctive design which identify the kind, size and finish of the product at first glance. This, says the company, makes it much easier for the retailer

to handle the packages, and, at the same time, enables the user to make his selection from a miscellaneous assortment much more quickly.

Carpet tacks are packed in blue and yellow, ⅛ and ¼-pound packages in special matching cartons which, when opened, make attractive counter displays. Many other tacks and small cut nails are packed in attractive blue and white packages also put up in cartons for counter displays. Dealers report noticeable increases in sales from use of the new line of packages and display cartons.

The company's line of cut tacks and small cut nails is now very extensive, including almost 60 different type, most of which are available in several finishes. A new catalog of the complete line can be obtained from the Republic Steel Corp., McCormick building, Chicago.

\$ \$ \$

Develops Four New Fluxes For Brazing and Welding

Four new fluxes have been added to the line of the Anti-Borax Compound Co., Fort Wayne, Ind. They are ABC aluminum flux No. 8, for welding sheet aluminum and all alloys of aluminum; stainless steel flux No. 9, for welding all stainless steels and rustless iron; silver solder flux No. 10, for brazing; an improved flux for bronze welding cast iron, known as Braz-Cast No. 4.

\$ \$ \$

Lacquer Finish Resists Attack of Perspiration

A new enamel, said to be perspiration proof, has been developed by the Roxalin Flexible Lacquer Co., Elizabeth, N. J. Metal disks coated with the new lacquer and carried in contact with the human body showed no effects of perspiration attack after seven weeks, the total time tested. By actual tests, says the company, ordinary finishes break down in one hour to one week when exposed to perspiration.

The new finish is recommended for use on steel cabinets, telephones, cash registers, scissors, files and many other metal products which are handled by perspiring fingers.

Charts Specify Lock Nuts and Washers For Use with Roller Bearings

TO SIMPLIFY the problem of selecting lock nuts and washers for use with its bearings, the Timken Roller Bearing Co., Canton, O., has prepared a series of charts listing lock nuts and washers. Full design details are given for the first two designs shown in the illustration, and the nuts and washers listed can be used with equal success for the other three types of applications by making proper allowances. Thirty-one different sizes of lock nuts are listed, for use with 457 different Timken cones in the case of design 1, and 207 different cones in design 2.

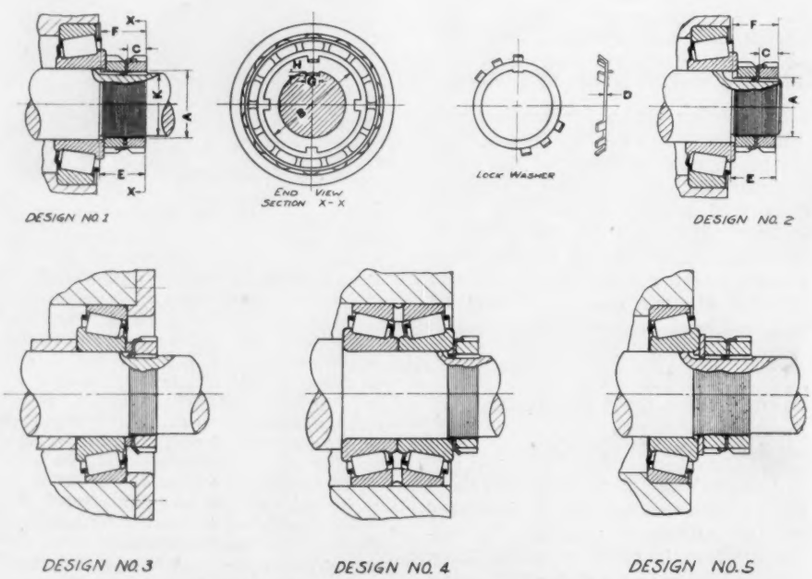
The layout shown in design 1 is intended for cases in which it is desired to have the maximum possible shaft extension diameter. Under this heading are listed all the cones suitable for the class of application, grouped under the largest thread that can be used with them.

In the case of design 2 the bearing cone has been selected for the nut listed on the basis of proper cone backing rather than thread diameter. In this case it often is possible to use a smaller size nut than would be used in design 1, and at the same time secure the necessary cone backing. Fundamental dimensions for the nut and shaft are listed.

Design 3 covers applications where a single lock nut and tongued washer is used to clamp some other member or an assembly through the cones. In this case it is necessary to provide a small spacer between the front face of the cone and the tongued washer in order that the washer will not interfere with the bearing cage. In design 4 a single lock nut and tongued washer is shown as used in connection with an NA type bearing. In both designs the proper size nut to use may be selected quickly from the list, applying the dimensional qualifications detailed in designs 1 and 2.

Automotive practice requires a slightly lighter fit for cones in certain applications than is called for in industrial applications. Design 5 illustrates such a case. Here a hardened tongued washer should be used between the inner nut and the cone face. The dimensions shown in designs 1 and 2 can be followed for automotive applications except that the length of the thread and keyway must be increased by an amount equal to the thickness of the hardened washer.

Copies of these charts may be obtained free upon request to the Timken company.



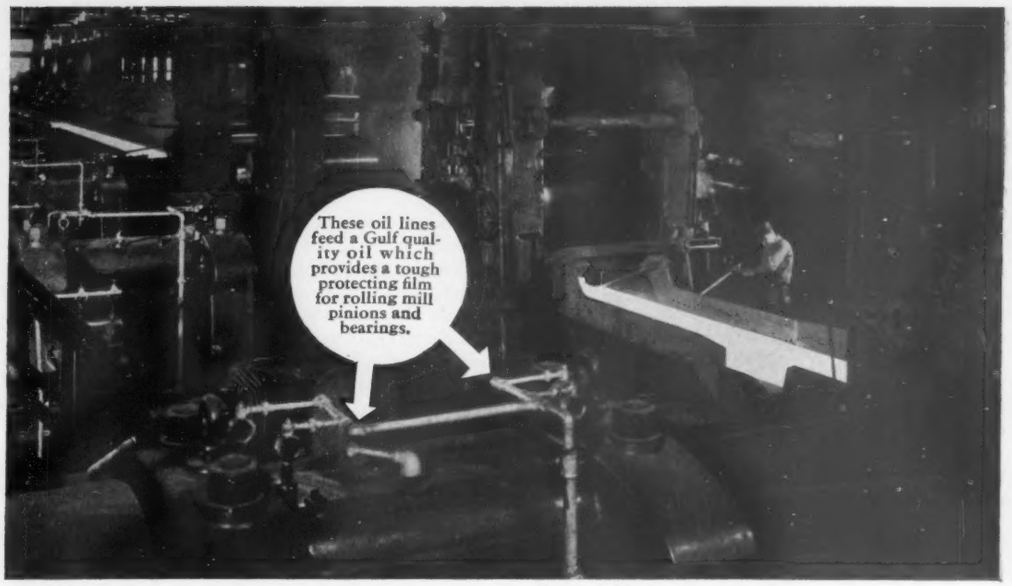
Five bearing layouts for which charts listing lock nuts and washers have been compiled

Announce Details of New Ten-Room Steel Panel Home

First government insurance on a mortgage loan for the construction of a steel house was granted in the Chicago district recently. The house, to be built in River Forest, Ill., is a design of General Houses Inc., Chicago, and will be a two-story, ten-room dwelling of steel panel construction.

The home will have three baths; a two-car, attached garage; with a warm air heating plant located on the main floor, adjacent to the laundry. It will be equipped with an air conditioning system and will be thickly insulated with rock wool. Three bedrooms, two baths, a sun

AT THE RIGHT is a four-high continuous rolling mill in a leading plant where Gulf lubricants are making an outstanding record of economy and efficiency.



4 HIGH MILLS *Demand* GULF QUALITY LUBRICANTS!

Gulf Has Developed Special Lubricants to Provide for Great Pressures

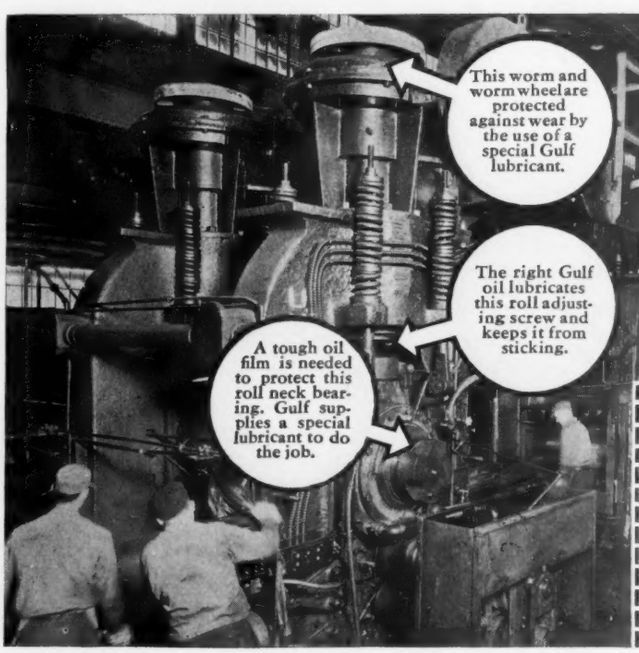
TO PROTECT their investment in costly modern equipment, leading mill operators have standardized on Gulf lubricants and engineering service.

Gulf engineers, thoroughly familiar with the design and lubrication of modern equipment operated in steel and metal working plants, can be of real assistance to you. They will help you set up a lubrication procedure designed to give you lower maintenance, power and lubrication costs, and they will work with your operating organization consistently to secure the economies you want.

Set aside a definite time to discuss this matter fully with a Gulf engineer.

GULF REFINING COMPANY, PITTSBURGH, PA.

District Sales Offices: Boston · New York · Philadelphia · Atlanta
New Orleans · Houston · Pittsburgh · Louisville · Toledo


This worm and worm wheel are protected against wear by the use of a special Gulf lubricant.
The right Gulf oil lubricates this roll adjusting screw and keeps it from sticking.
A tough oil film is needed to protect this roll neck bearing. Gulf supplies a special lubricant to do the job.

AT THE LEFT is shown another four-high continuous mill in a large steel plant. Gulf supplies special lubricants which are making an outstanding record for low bearing maintenance cost.

GULF INDUSTRIAL LUBRICATION

Would you like to have information regarding lubricants or technical oils for use in your plant? The coupon is for your convenience.

GULF REFINING COMPANY S. 5
3800 Gulf Building, Pittsburgh, Pa.

I would like to have information regarding lubricants for .....

Name.....
Company.....
Address.....

room and roof deck comprise the second floor.

Five steel panel dwellings by General Houses Inc. already have been erected and purchased for occupancy.

A.S.T.M. Completing Plans For Meeting and Exhibit

To provide ample time for presentation of the many technical reports and papers, the American Society for Testing Materials is scheduling 16 sessions for its thirty-eighth annual meeting to be held in the Book-Cadillac hotel, Detroit. June 24-28. During the five days of the meeting, the society's third exhibit of testing apparatus and related equipment will be open.

Technical sessions will be devoted to the subjects of testing, automobiles, ferrous metals, corrosion, fatigue and effect of temperature on metals, spectrographic analysis of materials, and nonferrous metals.

Dr. L. B. Tuckerman, national bureau of standards, Washington, will present the Edgar Marburg lecture on June 26, his subject being "Aircraft: Materials and Testing." The annual dinner will be served on the same day and will feature two addresses on "The Relationship of Materials to the House of Today and Tomorrow."

In addition to displays by leading companies in the testing instrument and related apparatus fields, the exhibit will include noncommercial apparatus sponsored by the society's committees or research laboratories for carrying out special tests and research work. Committee B-3 on corrosion of nonferrous metals and alloys will have an extensive display of atmospheric, galvanic, electrolytic and immersed test specimens which it has collected from the various test racks throughout the country after being examined following the first cycle of exposure. The committee on metallography will sponsor a special display of photographs and other materials which are related to this field.

Woven Galvanized Wire Tape Shows Merit as Roadguard Material

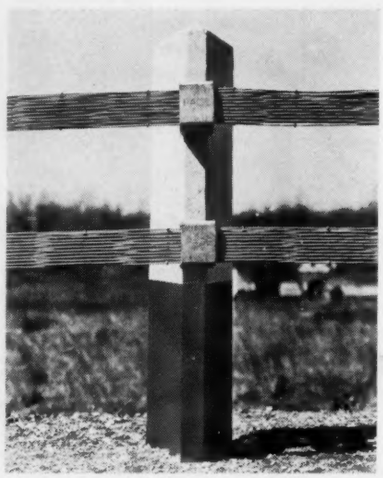
STEELMAKERS and fabricators alike have realized for some time the potentialities inherent in suitable guards for highways, for it is generally conceded construction of modern roadways has far outpaced the protective function of the highway guardrail.

Aside from the use of steel strip, sheets, and woven wire fencing in many localities for roadguards, the use of drawn wire has now assumed a prominent position. A leading application of drawn wire is in the form of a woven tape, around 2½ inches in width and offered commercially in reeled lengths up to 2500 feet. This tape, or band, is fabricated from No. 11 W. & M. gage wire, hot galvanized.

The tape is formed from sinuously weaving 21 of such wires so as to form in effect a continuous flat strip. While maintaining a minimum tensile strength of 20,000 pounds per square inch, and, according to quality specifications, a potential tensile of as high as 35,000 pounds per square inch, the effect of this woven unit has the result of eliminating internal stresses, adding elasticity, and permitting each of the 20 wires to act independently under impact.

At 90 degrees to these line wires are spaced No. 9 W. & M. gage half-round steel clips. These clips, beveled at both ends to fasten securely both the top and bottom line wires, are spaced every 6 inches.

Many states have already specified this form of highway guard. Texas has made several installations, one of which was around 50,000 feet in length. Ohio has put in a number which include several installations of around 10,000 to 15,000 feet. This type of road guard is being produced and marketed by the Page Steel & Wire Co., Monessen, Pa.

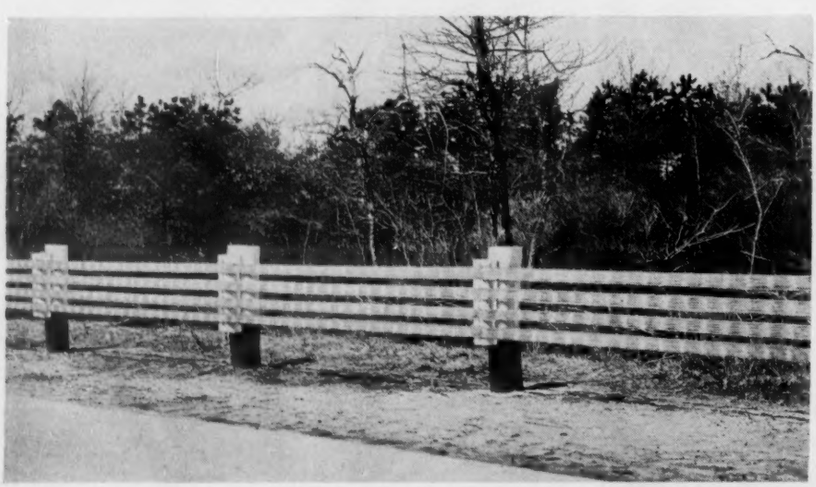


This illustrates how the woven wire guard tape is mounted on a post

Many applications of the wire traffic tape principle, however, are being used to suit actual traffic conditions. Although the individual tape is uniform as to depth and construction, two, three and four-tape installations are being recommended for roads where vehicular speeds vary. Generally, wood posts are employed, although it is possible to use concrete and steel fence posts. The traffic tape may be fixed onto poles in various offset methods. In some instances a flush type of bolt fitting is recommended.

Care in galvanizing the wire strands making up the tape is important from the standpoint of weather resistance. Page Steel & Wire Co. galvanizes by the hot dip method giving the zinc coating for each wire 0.8-ounce minimum per square foot of surface. This finish is capable of withstanding four copper sulphate standard testing solutions without resultant trace.

Several interesting and exhaustive tests have been conducted on this



Each strip of tape is made up of 21 independent 11-gage hot galvanized wires, woven together and held by half-round steel wire clips

THE RECORD . . .

Wide Hot Strip Mills

Completely G-E equipped

American Rolling Mill Co., Butler, Pa. . . . . (42 in.)
Weirton Steel Co., Weirton, W. Va. . . . . (54 in.)
Republic Steel Co., Warren, Ohio . . . . . (36 in.)
Wheeling Steel Corp., Steubenville, Ohio . . (60 in.)
Great Lakes Steel Corp., Ecorse, Mich. . . . . (38 in.)
Allegheny Steel Co., Brackenridge, Pa. . . . . (38 in.)
Otis Steel Co., Cleveland, Ohio. . . . . (72 in.)
Illinois Steel Co., Gary, Ind. . . . . (38 in.)

Partially G-E equipped

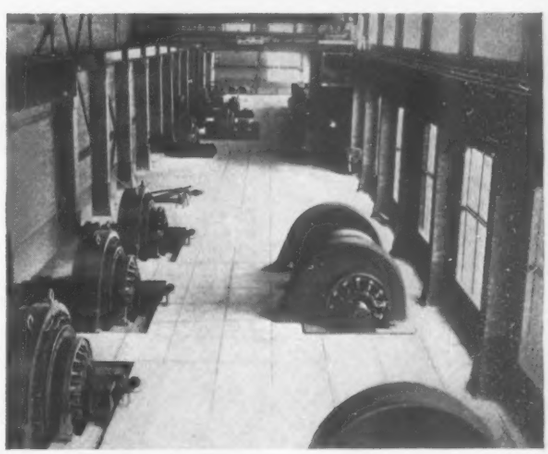
Inland Steel Co., Indiana Harbor, Ind. . . . . (76 in.)
Youngstown Sheet & Tube Co., Youngstown, O. (79 in.)
Carnegie Steel Co., McDonald, Ohio. . . . . (42 in.)

Getting your money's worth

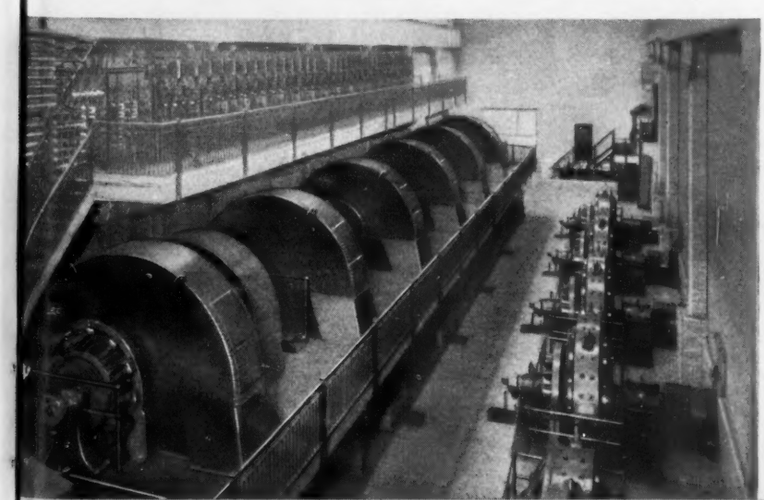
in Hot Strip Mill Drives

G-E EXPERIENCE in the manufacture and installation of wide hot strip mill drives assures you that your mill will go into operation promptly and easily.

G-E EXPERIENCE gives you a drive that permits continuous operation of your mill at high rates of production.



G-E EXPERIENCE gives you a properly balanced and co-ordinated drive, flexible and easy to operate — saving time, money, and labor.



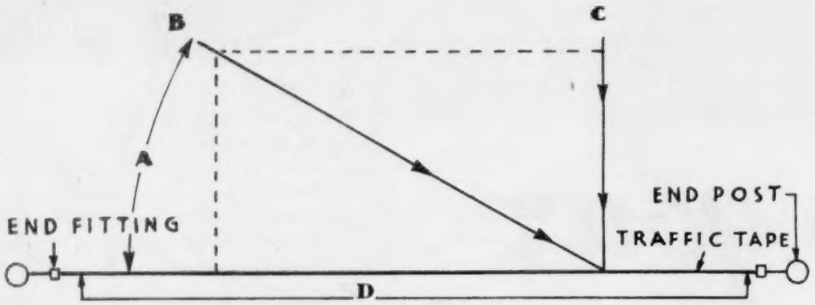
G-E EXPERIENCE — take advantage of it by letting our steel-mill specialists, nationally recognized, assist you in selecting the proper electric equipment for your mill. Call the nearest G-E office today. General Electric, Schenectady, N. Y.

008-18H

GENERAL ELECTRIC

Impact Tests on Highway Guard Tape

Speed of car, m. p. h.	Angle of impact, *A*	Kinetic energy at *B*, ft.-lbs.	Impact load at *C*, ft.-lbs.	Impact load loss, 20%, ft.-lbs.	Impact load at *D*, ft.-lbs.
32.7	15°	149,010	38,805	7,761	15,517
34.0	15°	152,128	39,617	7,923	15,847
36.0	30°	173,021	86,510	17,302	34,604
37.1	30°	184,123	92,061	18,412	36,824
40.0	60°	212,436	183,890	36,778	73,556
41.0	60°	224,851	195,564	39,113	78,226



Sketch showing test methods used in obtaining data given in table of impact tests

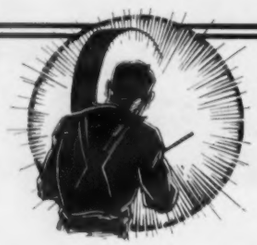
type of traffic tape. Loaded automobiles were started at the top of an incline and directed to strike the road tape at 15, 30, and 60- degree angles. Speeds ranged from 25 to 40 miles per hour. In each case the tests proved satisfactory in view of the fact the interiors of the automobiles were not disturbed, thus indicating that any occupants would not have undergone injury.

The accompanying table shows the results of six of these tests, the various points referred to being indicated on the sketch reproduced herewith. Weight of the car was 4000 pounds; Kinetic energy (*KE*) is calculated by the following formula, where *M* is weight of the car and *V* is velocity in feet per second:

$$KE = \frac{M V^2}{2 \times 32.16} \text{ foot pounds}$$

Actions and Reactions

IN THE WELDING FIELD



BY ROBERT E. KINKEAD

IN THIS column, the author, well-known consulting engineer in welding, is given wide latitude in presenting his views. They do not necessarily coincide with those of the editors of STEEL.

Relief

THINGS are not right in the economic world. Perhaps they never were. But if the picture gets to looking so cockeyed you cannot stand it, here is the way to temporary relief:

Catch one of the air liners which takes off at about dusk for a flight of two or three hours, and witness the loveliness of the physical world from aloft. At 5000 feet you will not be able to remember a single world from the speeches of Tugwell-Long-Wallace-Coughlin. At 10,000 feet you will begin to wonder at the marvelous human organization which made the flight possible and so perfectly safe. The cure is beginning to work. At 15,000 feet, and perhaps soaring through the clouds in the moonlight, you recall that one of the Wright brothers is still living and that all of this has come about in less than the span of one man's life. Over the side, the lights are beginning to twinkle on farms, in villages, and in industrial districts. The physical greatness of America unfolds in a majestic pattern. Now the pilot is talking with the airport; and that is an achievement of your lifetime.

You are back on the ground again. The taxi driver socks you the meter rate to take you to the hotel when his company has a contract flat rate. Yes, you are back on the ground again, but it was a great flight, a grand vision.

Been Home Recently?

Back in our home town recently we caught up with lives and affairs of people we have known for 30 to 40 years. Dwight Matchette, now clerk of the Ohio senate, asked this writer if he was as ornery as he used to be. The best answer we could think of at the moment was that we have the same impulses but that time has slowed us down a little.

Then there was Pat who used to drive the other delivery wagon for the Dorman grocery. He is a well known corporation lawyer now in a distant city. It was Pat, according to our recollection, who developed the technique of walking on the grass for noiseless delivery of groceries at the back door on Saturday night. Kicking the kitchen door open of a sudden often disclosed the lady of the house taking her bath in the family washtub.

Lowell Thomas went away and became famous and the folks are tremendously proud of him. Zach Landsdowne was killed in line of duty on the Shenandoah. "Jelly" Burns, the ball player, is still there, running a pool room. Some have hung themselves, others have just died.

These people are our folks. Our memories are of friendliness, of good neighbors, kind deeds. When we go back, we are recognized as the Kinkead boy who went away to make a place for himself in the world. But we still belong to them. We are proud and grateful for that.

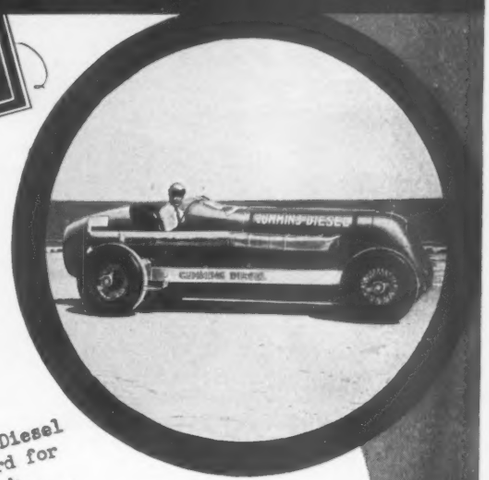
Guessing

If a farmer picks the wrong place to farm and uses the wrong methods, his farm is likely to blow away. The government, however, will give him a new farm and more operating capital. Manufacturers of welded pressure vessels who guess wrong can beg on the street corner. If they guess right and make money the government takes it away from them and gives it to more farmers who are unhappy for some reason or other. This is often called statesmanship.

NICKEL PLAYS VITAL ROLE IN NEW SPEED RECORD FOR DIESEL VEHICLES....

Read this tribute from the Cummins Engine Company

CUMMINS ENGINE COMPANY
MANUFACTURERS OF
Cummins Diesel Engines
FOR EVERY PURPOSE
AUTOMOTIVE AND LOCOMOTIVE ENGINES
ELECTRICAL GENERATING SETS
POWER UNITS - MARINE ENGINES
INDUSTRIAL ENGINES



Columbus, Indiana April 3, 1935

The International Nickel Company, Inc.,
67 Wall Street,
New York, N. Y.

Gentlemen:

On March 2nd, 1935, a Cummins Diesel Equipped Race Car established a new World's Record for Diesel Vehicles of 137.195 M.P.H. at Daytona Beach, Florida. This brings to America the new World's Record and ralses the previous record, held by England, by approximately 27 M.P.H.

You might be interested in knowing that this record would not have been possible had it not been for the various Nickel Alloys used throughout the engine. To attain such speed, it is necessary that extreme horsepower be developed. It would be impossible to do this with a Diesel Engine were it not for the excellent work which your company has done in the direction of research toward the development of special alloys for various applications. We feel that this record is a victory for your good selves as well as for the Cummins Engine Company, and we congratulate you on your share of it.

Yours very truly,
CUMMINS ENGINE COMPANY
C. L. Cummins
President

Nickel Alloy Steel and Nickel Cast Iron parts used in record-breaking Cummins Diesel Automotive Engine

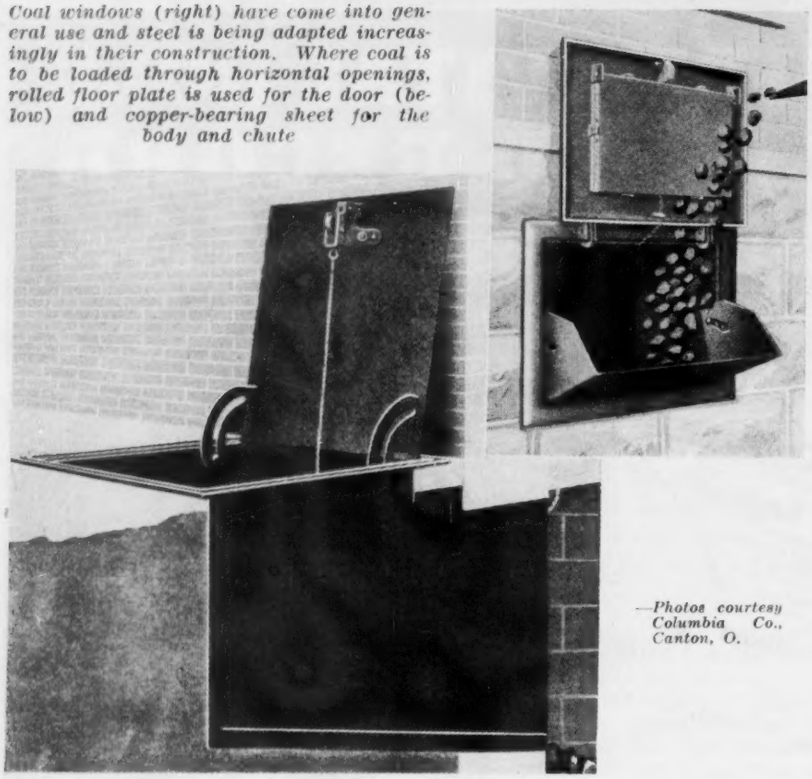
Name	*S.A.E. No.*	*Material*
Cylinder Liners	....	Nickel-Chromium Cast Iron
Piston Pins	3120	Nickel-Chromium Steel
Camshaft Gear	3250	Nickel-Chromium Steel
Crankshaft	....	Nickel-Chromium Moly. Steel
Crankshaft Pinion	3250	Nickel-Chromium Steel
Fuel Pump Vertical Lever	3215	Nickel-Chromium Steel
Fuel Pump Vertical Lever Pin	3215	Nickel-Chromium Steel
Fuel Pump Plunger Lever	3215	Nickel-Chromium Steel
Fuel Pump Disc Shaft	3130	Nickel-Chromium Steel
Governor Weight Pins	2315	3½% Nickel Steel
Valves	....	Austenitic Ni-Cr-Si Steel
Water Pump Shaft	....	Stainless Steel—18% Cr., 8% Ni.

NICKEL ALLOY STEELS

THE INTERNATIONAL NICKEL COMPANY, INC.

67 WALL STREET, NEW YORK, N. Y.

Coal windows (right) have come into general use and steel is being adapted increasingly in their construction. Where coal is to be loaded through horizontal openings, rolled floor plate is used for the door (below) and copper-bearing sheet for the body and chute



—Photos courtesy Columbia Co., Canton, O.

LARGE USES OF STEEL IN SMALL WAYS

286th Article ◆ Coal Windows

MORE steel continually is being consumed in the manufacture of coal windows for residences, apartment houses and public buildings. Practically all new buildings now are being equipped with them, function being to provide an accessible opening for loading coal into cellar bins, and which may be locked in the closed position.

Coal windows of improved type, such as shown in the accompanying illustration are provided with hoppers which protect the wall of the building against discoloration and bruises, save lawns and prevent wastage of coal. The type window shown is opened, closed and locked by an operating device controlled from any convenient point in the building.

While many coal windows are castings of gray iron or semi-steel, the tendency in high grade windows is toward the use of rolled steel or a combination of rolled steel with malleable castings. The window shown, for instance, has a malleable iron body frame while the panel door and hopper are formed of copper-bearing galvanized steel sheets of heavy gage. Another design has a body frame of galvanized steel sheet and a malleable iron door frame into which a pane of glass is inserted. Complete with hoppers, the coal windows weigh from 54 to 110 pounds, depending on size. They usually are finished in black enamel paint.

Designed for Long Life

In the manufacture of high grade coal windows great care is taken to prevent failure due to wear or breakage. The window shown, for instance, has no bolts, rivets, springs or cotter pins. It has roller bearing hinges of the concealed type which cannot be sawed, cut or removed when the door is closed. The hopper is in one piece and automatically falls into position when the window is opened. The steel chain which operates the lock is given a rustproof surface. These are indicative of numerous other features of high grade coal windows in whose construction steel is used.

A modification of the coal window is the grade line coal chute, also illustrated herewith, which is used when it is desired to load the coal through a horizontal opening. In the model illustrated, the door is of ¼-inch rolled steel floor plate with water tight handle of malleable iron. The body and chute are of copper-bearing sheet steel. The self-opening lock is of malleable iron and operating chain is rustproofed. Hinges are of heavy gage galvanized sheet steel.

Metals Society Chapters Announce Meeting Program

A series of roundtable discussions on various metallurgical topics and a session on "The Role of Metals in the Transportation Industry" will comprise the technical portions of the program for the fourth sectional meeting of the Middle Atlantic group of the American Society for Metals to be held at Hotel Pennsylvania, New York, May 24. This group includes the New York, New Jersey, Philadelphia and Lehigh Valley chapters of the society.

The four roundtables, to be conducted in the morning, are as follows: "Stainless Steels — Applications and Misapplications"—L. S. Bergen, Crucible Steel Co. of America, chairman; "Heat Treatment in Protective Atmospheres"—Sam Tour, Lucius Pitkin, chairman; "Tool Room Practices"—F. R. Palmer, Carpenter Steel Co., chairman; and "Metallography"—J. R. Vilella, chairman.

The following papers and speakers are listed for the transportation meeting in the afternoon: "Railroad Industry", by E. J. W. Ragsdale, chief engineer, railway division, Edward G. Budd Mfg. Co., Philadelphia; "Aeronautical Industry," by J. B. Johnson, chief, materials division, war department, air corps, Wright Field, Dayton, O.; and "Automotive Industry," by J. M. Watson, metallurgical engineer, Hupp Motor Car Corp., Detroit.

New Corrosion Resisting, High Tensile Alloy Steel

A new alloy steel has just been announced by The Youngstown Sheet & Tube Co., Youngstown, O. This new product, known as Yoloy, is a nickel copper alloy steel having an exceptional resistance to corrosion and high tensile strength combined with high ductility, workability and weldability.

Yoloy steel is produced in sheets, strips, plates, bars, shapes, wire and seamless pipe.

ADVERTISING PAGES REMOVED

Tanks Last So Long

THIS *Portable* FEATURE TOO

Here is the tank which, according to General Steel Wares, Ltd., has given" complete satisfaction despite severe service." Indications are that this company will be able to repeat the same statement many years from now.

WHEN you buy most pickling tanks, future plant plans don't matter—the tank will be worn out before present layouts change. But when you buy Goodrich, remember you're buying a tank that, barring accidents, will last indefinitely, so the fact it can be moved is an important added value.

Several plants have found this out already. General Steel Wares, Ltd., of Canada, writes:

"Some months ago, it became advisable to make a change in the location of this tank. The design and construction of your Goodrich tank were such that we were able to move the complete unit to another department without injury to the tank and without loss of time or trouble."

LOWEST PICKLING COST PER TON

Of course the primary reason for tank selection is low pickling cost per ton and that's where Goodrich tanks lead the field:—

1. Because of their Triflex lining (a layer of hard rubber equipped with expansion joints, between two layers of soft rubber—a patented Goodrich construction) all danger of cracking or buckling is eliminated.
2. Because this lining is attached to the steel tank by the exclusive Vulcalock process, lining and tank become one inseparable whole, and pure rubber can be used—no "dope" is needed for attachment.
3. Because special brick sheathing, also with rubber expansion joints, is used to protect the rubber, rough service cannot harm these tanks.
4. Because of Goodrich advance in the science of rubber compounding, the rubber best suited to your needs is used—a rubber that permanently resists pickling solutions.

Goodrich Tanks can be repaired on the job, quickly and easily—but they don't need it. Barring accidents, you can leave leakage worry to your grandson. The B. F. Goodrich Company, Mechanical Rubber Goods Division, Akron, Ohio. (In Canada: Canadian Goodrich Co., Ltd., Kitchener, Ont.)

Goodrich *Rubber Lining*

ALL *products problems* IN RUBBER

New Gas Cleaning System Uses Hot Washing Stage

BY FRED WILLE and ALBERT MOHR, JR.
John Mohr & Sons, Chicago

INSTALLATION of fine gas cleaning and sludge recovery apparatus has been confined to a few blast furnace plants during the past few years on account of the high cost of the apparatus, high operating costs, and the large amount of space required. Nevertheless, blast furnace officials have given considerable thought to the fine cleaning of all blast furnace gas and to the recovery of all the metallic bearing flue dust from the waste water.

One of the recently designed systems for treating blast furnace gas and recovering the sludge, known as the Simplex system, will fine clean 80,000 cubic feet of blast furnace gas per minute at standard conditions direct from the dust catcher and recover the flue dust in the form of a heavy sludge. This system, as shown in the accompanying illustration, consists of two stages; first, the hot washing, humidifying and conditioning stage, and second, the condensing and cooling stage. The sludge is removed from bottom of first stage.

Hot water is a much more efficient gas washing medium than cold water. The reason for not using hot water was the cost of heating the water, or if the gas to be cleaned was hot, the impossibility of clarifying the hot dirty water in the then existing means of clarification due to the large convection currents set up in the single tray open type clarifiers, and the great loss of heat.

The hot dirty water falls from the apron of the hot stage into the top of the settling cones and is discharged at the bottom of the top cone. Between each cone hot water flows and is discharged at several places in the outside shell of each settling cone, the solids in the hot water settling on the cones and sliding into the center opening. The settling pans, as shown, are an efficient clarifier because the rate of subsidence of the flue dust follows the familiar Stokes' law.

$$V=\frac{2r^2(S-S')g}{e}$$

wherein
V=velocity of settling
r=radius of suspended particle
S=Specific gravity of suspended particle
S'=specific gravity of fluid medium
g=gravity constant
e=viscosity of fluid medium

For example, if the dirty gas washer waste water at 70 degrees Fahr. will settle in X number of minutes, the same waste water at 180 degrees Fahr. will settle as follows:

From the viscosity values of water from Table I the viscosity of water at 70 degrees Fahr. is 0.0098 poise and at 180 degrees Fahr. it is 0.0034 poise.

As the values of r, S, S' and g will be the same in both cases.

$$\frac{\text{Viscosity @ 180°F.}}{\text{Viscosity @ 70°F.}}=\frac{0.0034}{0.0098}(X)=0.0347X \text{ minutes}$$

The same waste water will settle at 180 degrees Fahr. in 0.347 of the time that it would at 70 degrees.

The solid contents of the hot water leaving the settling pans will be less than 10 grains per gallon. This water will discharge into the standpipe of the recirculating hot water pump for reuse in the hot stage.

The total free settling area of the settling cones is equal to 2550 square feet. This is the equivalent of a 57-foot diameter single tray thickner. This amount of settling surface is more than enough for the largest blast furnace. As the settling cones are at an angle of 60 degrees they will be self cleaning, but if, due to local operating conditions, it is desired, the settling cones can be provided with a rake mechanism. Due to the absorption of soluble salts in the washing water approximately 60 gallons of water per minute is bled from the standpipe of the recirculating hot water pump to hold down the concentration of soluble salts.

The sludge is removed from the bottom of the hot stage by means of a diaphragm pump which is automatically controlled to produce a sludge of uniform moisture contents.

Makeup water to the hot stage is furnished from the discharge of the second stage and will be about 100 gallons per minute when cleaning 80,000 cubic feet of gas per minute. These losses will be due to water carried over with the gas as entrained water, water discharged in the sludge and water flashed into steam by the sensible heat, and the superheated steam in the gas above the hot water temperature in the hot stage.

The efficiency of cleaning gas with hot water is much greater than with cold water, because the viscosity and surface tension of hot water is much less than cold water and the ability of the washing medium to wet the dust particle is therefore greatly increased. It is well known that if cold water is poured upon an impalpable powder the water will form globules upon the surface of the powder, while if hot water is added an emulsion is instantly formed[1].

The degree to which any mechanical or static spray will atomize is a function of the surface tension and viscosity of the fluid. In the atomization of a fluid energy is used in two ways; first, in extending the surface, and second, in overcoming the internal resistance of the fluid. As an example, suppose a mechanical spray was atomizing water at 70 degrees Fahr. and the average particle mass was X grains. The average particle mass when using water at 180 degrees Fahr. and keeping all other things constant, would be:

$$\frac{\text{Visc. @ 180°F.} \times \text{Surf. Ten. @ 180°F.}}{\text{Visc. @ 70°F.} \times \text{Surf. Ten. @ 70°F.}}X=\frac{0.0034 \times 61.00X}{0.0098 \times 72.50}=0.292X \text{ grains}$$

[1]Cleaning of Blast Furnace Gas by Frederich Wagner, page 55.

Table I

Physical Properties of Water

Temperature degrees Fahr.	Viscosity of water in poise	Surface tension of water in dynes
50	0.013	74.5
60	0.011	73.5
70	0.0098	72.5
80	0.0087	71.5
90	0.0076	70.5
100	0.0068	69.5
110	0.0062	68.5
120	0.0056	67.5
130	0.0051	66.5
140	0.0047	65.0
150	0.0043	64.0
160	0.0040	63.0
170	0.0037	62.0
180	0.0034	61.0

Table II

Physical Properties of Blast Furnace Gas

Temperature, deg. Fahr.	Partial pressure of water vapor, per cent	Partial pressure of fixed gas, per cent	Grains of water vapor per cu. ft. of gas
50	1.21	98.79	4.12
60	1.74	98.26	5.80
70	2.47	97.53	8.03
80	3.43	96.57	11.00
90	4.73	95.27	14.92
100	6.43	93.57	19.95
110	8.65	91.35	26.40
120	11.47	88.53	34.50
130	15.10	84.90	44.50
140	19.70	80.30	57.00
150	25.38	74.62	72.40
160	32.30	67.70	90.50
170	40.70	59.30	113.00
180	51.10	48.90	139.50

Table III

Comparison of Sizes

Size in microns	Size in inches	Nearest sieve size	Total surface of 1 Cu. Cm. when divided into cubes, sq. cm.
0.1	0.0000039	.....	600,000
0.5	0.0000197	.....	120,000
1.0	0.000039	.....	60,000
5.0	0.000197	2500	12,000
10.0	0.000394	1250	6,000
20.0	0.000787	600	3,000
30.0	0.001181	400	2,000
44.0	0.0017	325	1,365
74.0	0.0029	200	810
149.0	0.0059	100	403
177.0	0.0070	80	339
250.0	0.0098	60	240
297.0	0.0117	50	202
420.0	0.0165	40	143
840.0	0.0331	20	71
2000.0	0.0787	10	30

1 Micron=0.001-millimeter.

Thus it can be seen that the average size of the atomized water particle is much smaller. The degree of cleaning in any wet type of gas cleaning varies with some function of the degree of atomization.

In the hot stage the rough cleaning is performed by two sets of stationary hurdles. These hurdles are made of white pine, metal or ceramic acid tower tiles. The total wetted surface in the hurdle banks is approximately 100,000 square feet. This large amount of hurdle surface will remove completely all large coarse abrasive particles from the gas stream and humidify the gas. The removal of the large particles is performed cheaper by static means than mechanical means, because less power is used, and no rapidly moving apparatus is pumping dirty gas washer water loaded with coarse gritty flue dust.

Rotor Is Employed

Final cleaning in this stage is accomplished by passing the gas through a Bassler rotor, which consists of a cone disk with a large number of projecting pins set at an angle, the pins being staggered and spaced somewhat farther apart at the periphery. It will be noted that this design forms wedge shaped openings, between the pins which obviates the possibility of materials adhering to the wheel and clogging it. The water is delivered to the disk through a nozzle, which envelopes the cased rotor shaft.

In the hot stage the heat contents of the gas leaving the tower is equal to the heat contents of the gas entering minus the radiation and convection losses of the shell to the outside temperature. The heat contents of the entering gas is converted into water vapor. The partial pressure of the water vapor of the inlet gas is 15 per cent and the partial pressure of the water vapor of the outlet gas is 40 per cent. The gas leaves this stage with approximately 0.05-grain of dust per cubic foot, and with 100 grains of water vapor and at a temperature of about 170 degrees Fahr. This outlet temperature and water vapor content will vary with the top temperature and the water vapor contents of the dirty inlet gas.

The final cleansing and cooling is performed in the second stage. As the dust in the gas is finely divided there exists what is known in colloid chemistry as a disperse system. This system has two components (gas and fine dust) the size of the particles of one of the components (dust) has been so finely reduced until its dimensions are microscopic or submicroscopic.

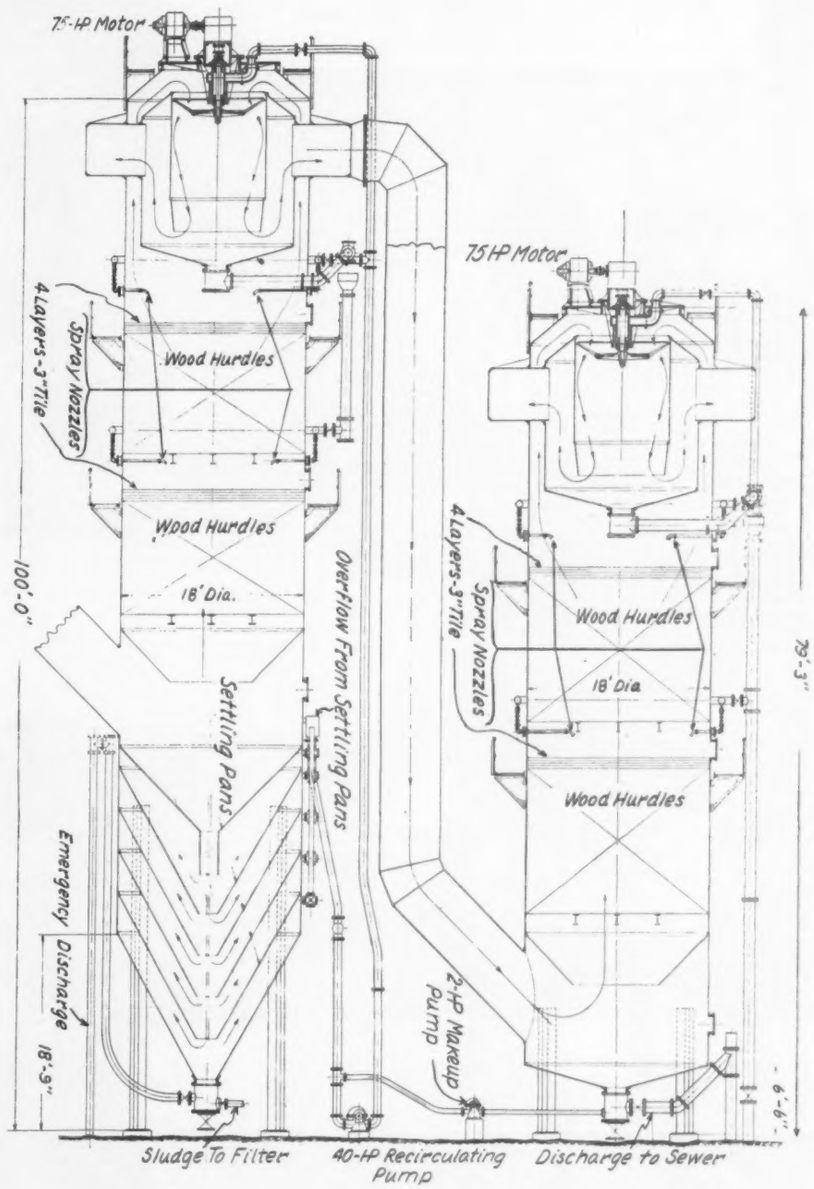
It is obvious that surface effects, which are undetected on materials having an area of few square centimeters will become pronounced when the material is dispersed to give a total surface of many thousand of square centimeters[2].

One of the most important results of this large surface is the adsorption of gas by the dust particles. As the partial pressure of the water vapor was increased from 15 to 40 per cent in the first stage the adsorbed gas will be sufficient to wet the fine dust by simply cooling the gas due to the condensation of the water vapor in the adsorbed gas.

Another physical change in the second stage that is of paramount importance in the fine cleaning of gas

(*Please turn to Page* 56)

[2]Theoretical Chemistry by Getman and Daniels, page 208.



Elevation of new gas cleaning system showing the primary and secondary units with thickener

CARNEGIE Steel Company traces its history back to a little forge shop, established in 1858 for the manufacture of railroad axles, forged from scrap iron. The product was considered good and the little shop expanded miraculously. Forging practices and facilities have, of course, improved greatly since that time and Carnegie has kept pace. Today we are in position to supply heavy commercial forgings of every description. Our ability to satisfy your requirements may be attributed to a nice balance of mature experience and modern facilities.

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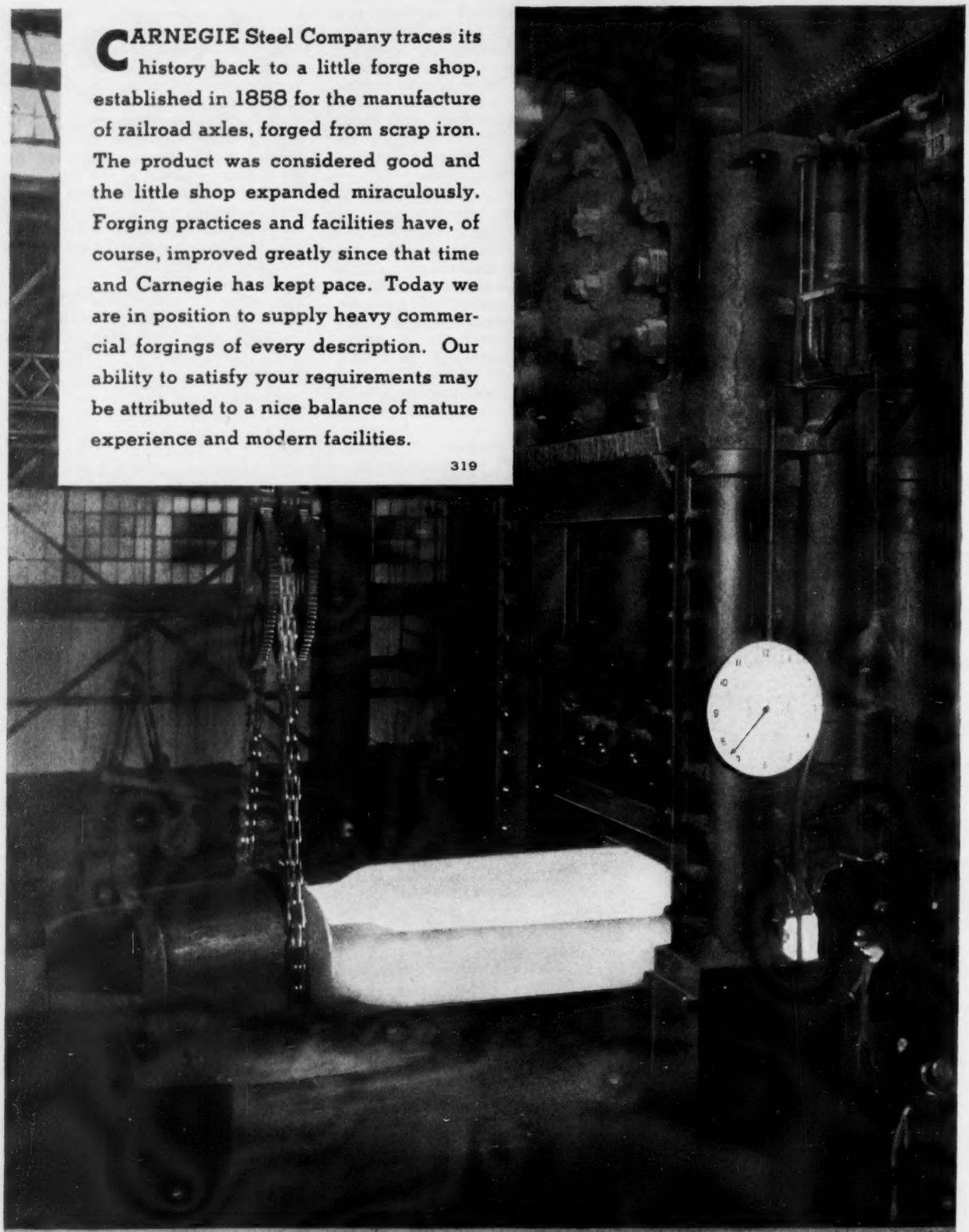

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STEEL *Will Present*—

A CLINICAL STUDY OF OPEN-HEARTH FURNACE DESIGN

DISCUSSION of the ancillary system of the open hearth or that part of the furnace system located beneath the charging floor, and methods for designing it along more efficient lines will be presented by William C. Buell Jr. in a new series of articles which will be published in STEEL, beginning with an early issue.

As in the author's former articles on open-hearth furnace design which were presented in STEEL, the subject of the correct economic use of refractories and insulations receives major attention.

Methods of determining the necessary sizes of the several critical areas of the ancillary system are described and the importance of the correct development of these areas emphasized.

Features of single and multiple pass regenerators of both the vertical and horizontal type are discussed fully. A simple method is presented by means of which problems of heat transfer in the regenerators may be solved graphically. Checker brick of plain and patented designs, the method of laying the brick, the development of flue sizes, etc., are considered. The correct selection of valves and waste-heat boilers and the control means of the entire furnace system are discussed.

As in the prior articles, the attempt is made to place the solution of all technical problems in such simple form as to carry a sufficient understanding to the lay reader, and through a continuation of the use of graphics, to offer a rapid method of solution of furnace design problems to the technical reader.

While the articles are written around the open-hearth furnace, the apparatus developing the highest combustion temperatures of industry, much care has been exercised to present fundamental data in such form that their modification for use with any combustion apparatus, may be accomplished easily.

A synopsis (tentative) of the articles to be presented, follows:

Chapter 1. LAYOUT
- a. Space available as found in existing plants.
- b. Usual limits of layout space.
- c. Nomenclature of the ancillary system.

Chapter 2. SLAG POCKETS
- a. Details of slag pockets as found in present furnaces.
- b. Principal factors entering into the design of slag pockets.
- c. Insulated vs. noninsulated slag pockets.
- d. Discussion of stresses developed in the binding steel.

Chapter 3. FANTAILS
- a. One of three most critical areas of furnace design developed in fantails.
- b. Comparison of area and flow effects as found in typical furnaces.
- c. Rational basis of design.
- d. Discussion of mechanical design of fantails.

Chapter 4. REGENERATORS
- a. Discussion of principal functions of regenerator chambers.
- b. Comparison of sizes of regenerator chambers as found in typical furnaces.
- c. Development of appropriate regenerator volumes and areas for producing any tonnage with any fuel.
- d. Structural features of regenerator design.
- e. Features of refractory designs with comparative costs.

Chapter 5. CONNECTING FLUES
- a. Problems of the connecting flues as developed in typical furnaces
- b. Simple design methods by which these components may be improved.

Chapter 6. CHECKER WORK
- a. Discussion of six common methods of arranging checker work to develop single and multiple pass, vertical and horizontal flow.
- b. Checker brick, present practice as to size and method of laying.

Chapter 7. GRAPHIC METHOD
Plan for direct quantitative solution of problems involving transfer of heat in regenerator chambers.

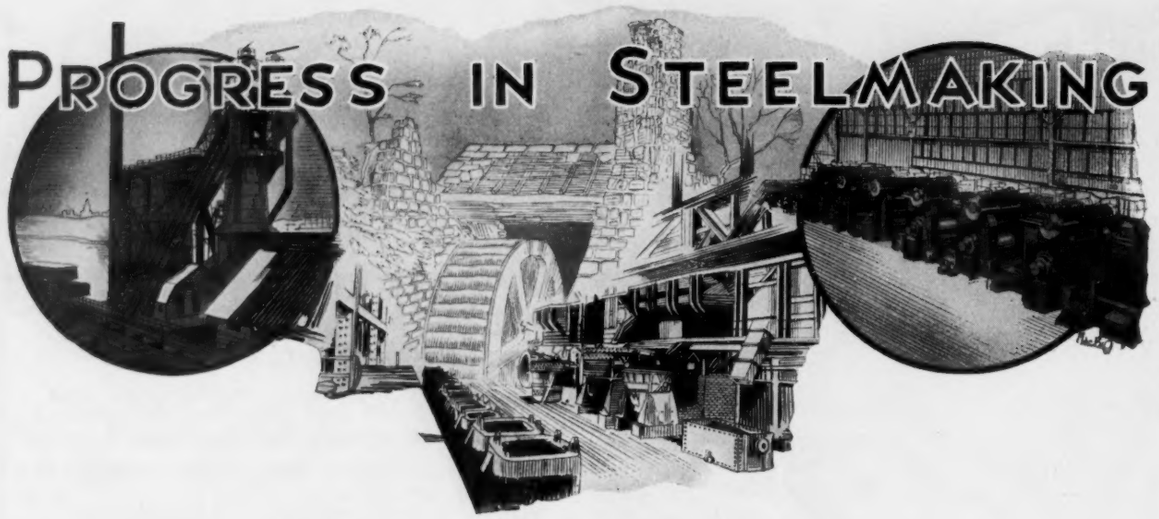
Chapter 8. DESIGN OF CHECKER PASSES AND FLUES
Using methods described in Chapter 7.

Chapter 9. THE FLUE SYSTEM
- a. Importance of correct flue layout and design in overall furnace operation.
- b. Minimum area for good layout.
- c. Design and construction features.

Chapter 10. VALVES
- a. Schedule of valves of typical furnaces.
- b. Valves of the late past.
- c. Tenets of good valve usage.

Chapter 11. WASTE-HEAT BOILERS
- a. Boilers, type and size of existing installation.
- b. Ideas of present trend as to type.
- c. Notes on operation.
- b. Credits for waste-heat steam.

Chapter 12. SYSTEM CONTROL
Discussion of apparatus and instruments available for control and benefits from their use.



Experiments with New Flux

Several electric furnace operators, especially manufacturers of stainless steel, have been experimenting with the use of cement clinker as a flux. It is reported that one or two midwestern foundries have been prominent in this experimentation, although the successive result has not as yet been made public.

• • •

Develops Steel Commodity

Steel lath provided with a composition board backing is a newly marketed commodity. The backing serves as an insulation against heat and cold, acts as a centering device and prevents waste of plaster.

• • •

Eliminates Surface Pits

A special metallic element compound, used in a box as a lubricant for wire drawing but without the lime coat, is being employed experimentally for cold drawing. This practice does not leave the finished products with pits on the surface as is encountered with a lime coat and yet the "roller-bearing" effect is present.

• • •

Sprays Keep Surface Clean

Maintaining a clean surface on the big bell of blast furnaces, particularly when operated on slack wind, is accomplished at one plant by sprays installed in the gas seal. Water from this source keeps the bell cool and prevents material baking on the surface of the metal. Another system followed by operators is to keep the bell free of all material until the gage rod indicates the furnace will take the charge.

• • •

Process Conserves Zinc

Increased flexibility of the coating making possible deep stamping, bending or twisting of the coated commodity is claimed for a new galvanizing method recently introduced in England. The greater portion of the bath is composed of molten lead on which floats a dividing liquid that, in turn, supports the layer of pure zinc only a few inches deep. A special lining protects that part of the bath surrounding the zinc so that it cannot come in contact with the iron. No matter how violent is the action when the steel enters, the three materials composing the bath always settle down afterwards into their former position, zinc on top, lead at the bottom, and the dividing liquid between. Claims for the new process are the complete absence of waste zinc; the formation of hard zinc is negligible, and what does form adheres to the steel being coated, leaving none in the bath. Stress is laid on the saving in time and the economy in zinc since a thinner coating can be applied.

• • •

Makes Low Porosity Brick

Vacuum pressing as applied to the power press process for forming fireclay refractories is a recent development. Evacuation of the mold box prior to and during pressing permits the production of brick of lower porosity. Such brick, according to a refractory interest, are attractive for checkers in blast furnace stoves since they have the greatest heat storage capacity and greater resistance to slag penetration. Another field for this type refractory is that of blast furnace linings.

• • •

Crane Brake Is Automatic

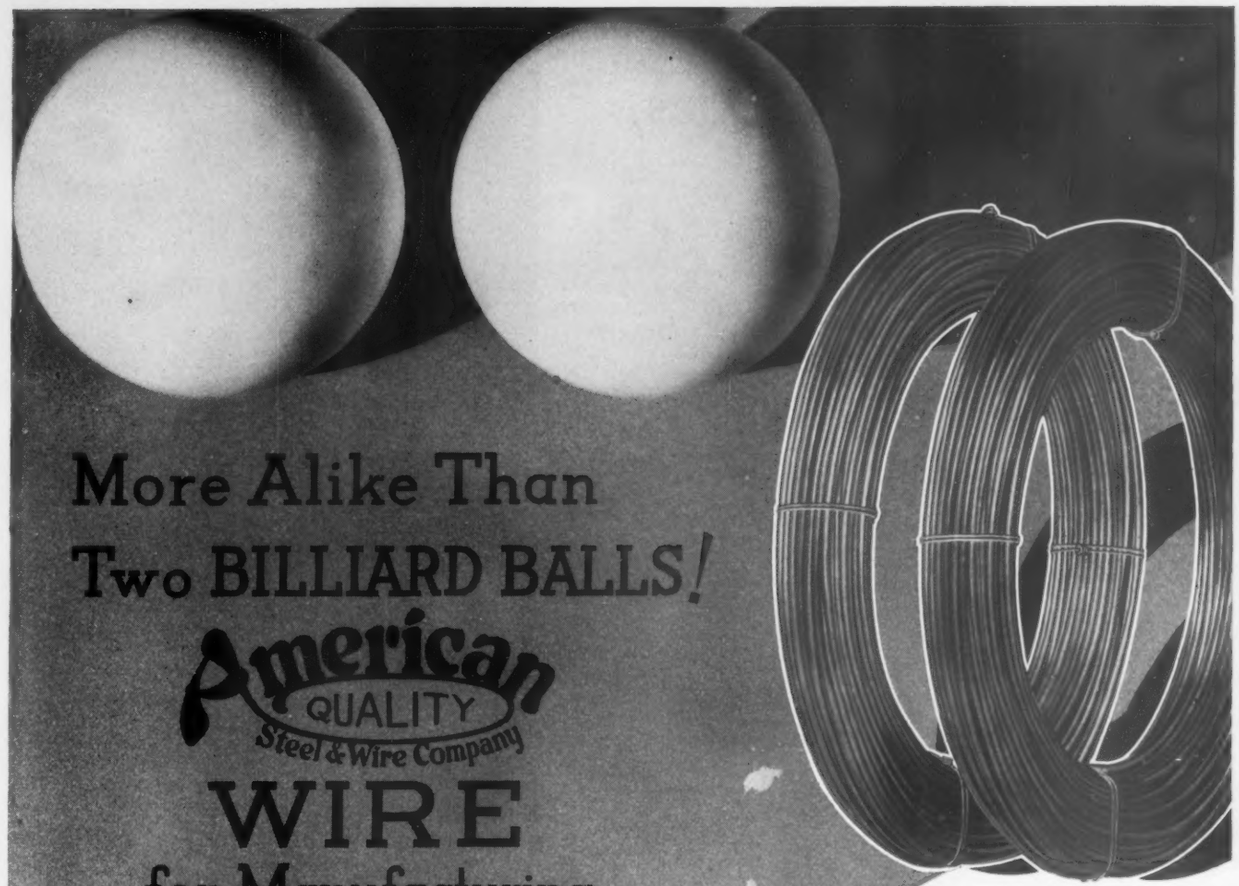
An electrically-operated device has been incorporated in the braking system of heavy overhead traveling cranes as an added safety measure. The device automatically and instantly sets the brake in case of power failure or in case hydraulic operation fails.

MOST OF US often wonder what this or that steel plant is doing in the way of improving its practice. There was a time when we did more visiting but lately conditions keep us close to our work.

We can make these visits by proxy, however, for every week, in this section, STEEL, takes you in many plants and gives you the opportunity of securing profitable ideas in a fraction of the time it would take you to secure them yourself.

If you desire further information on any idea, announcement, lead or suggestion presented, please write us. Perhaps you know of an idea or "shop wrinkle" that has effected a reduction in operating costs at your plant. If so, won't you send it along?

The Editors



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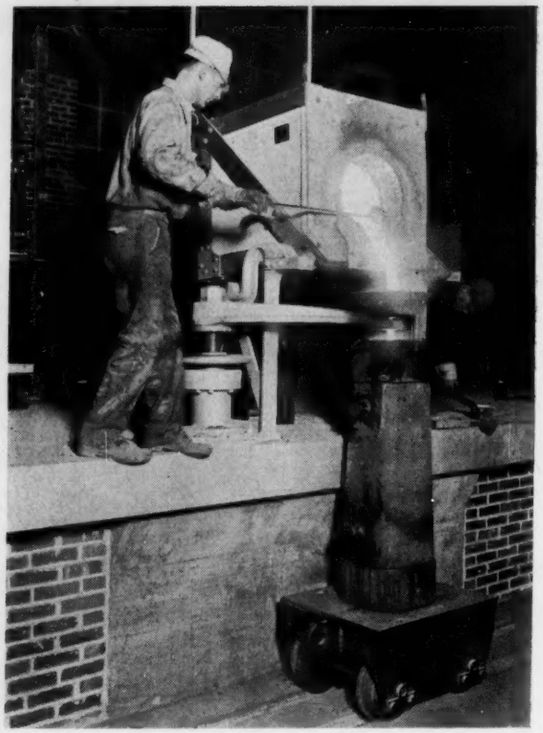
Production, Properties, Analyses and Uses of Cobalt Magnet Steels

BY EDWIN F. CONE



Pouring a heat of cobalt magnet steel from high-frequency induction furnace

PERMANENT magnet steels are by no means a curiosity—the simple compositions have been known for many years; for example, the straight carbon variety. Then there is the tungsten alloy magnet steel which, with one type of cobalt steel, has been in use for some time.

As a result of the war, however, new compositions were developed, and now alloy steels of this class are numerous. Because of the high cost of tungsten during the war and also because of the much greater demand for permanent magnet steels, new varieties were developed, particularly those containing chromium. Today there are three types of chromium magnet steels, each suited to particular conditions because of differences in magnetic properties.

With the demand for a permanent magnet steel having still higher properties than any previously produced and one which would meet other more exacting industrial applications, a high-cobalt permanent magnet steel has been developed containing upward of 35 to 40 per cent cobalt as well as certain proportions of tungsten and chromium.

Prominent among producers of permanent magnet steels in general and of the high-cobalt brand in particular is the Bethlehem Steel Co., Bethlehem, Pa. Besides the usual types of carbon, chromium and tungsten compositions, this company has developed a 38 per cent cobalt permanent magnet steel under the trade name Cobaflux. The accompanying table gives the chemical composition of this steel which contains, besides the 38 per cent cobalt, about 5 per cent chromium and 4 per cent tungsten. Type analyses of the other magnet steels produced by the company are included in the table. Comments in this article are largely confined to a discussion of the manufacture, properties and uses of the high-cobalt steel.

The special high alloy types of permanent magnet steel are melted and processed in the high-frequency induction furnaces in the tool and special steel plant at Bethlehem. Here, besides a 14-pound high-frequency unit for small heats and experimental purposes, there are two 600-pound and two 1200-pound units of the same type. The plant has also a 3-ton and a 6-ton basic arc furnace.

The high-cobalt steel is made under patents granted to Brace of the Westinghouse Electric & Mfg. Co., and to Honda, a prominent metallurgist of Japan. There are at least five licensees in the United States.

Aim To Hold Down Carbides

The alloy is poured into 4½-inch square ingots—the small size being stipulated to insure rapid solidification. This is a guaranty of the more complete elimination of most of the carbides—an important factor in the final properties of the magnet steel. Acutally the size of the resulting carbide particles depends to some extent on the size of the rolled product; that is, in a ¼-inch square bar the carbide particles are smaller than in a 1-inch bar.

Paralleling the practice in the production of the company's high-grade tool steels, the ingots are all hammer-cogged to billets instead of being broken down under rolls. Each billet is ground carefully on all sides and pickled. For conversion, the billets are rolled hot into bar stock in flats, rounds and squares from ¼-inch up. For certain applications, demanded by customers, special shapes are also rolled. The final hardness

Analyses and Properties of Magnet Steels Produced by Bethlehem

Type	Per cent C	Mn	Cr	W	Co	Residual induction	Coercive force	Energy product	Treatment, degrees Fahr. and medium
Carbon	0.60	0.80	.....	.....	.....	9,000	35	180,000	1525 water
Chrome	0.60	0.40	1.0	.....	.....	9,000	45	200,000	1525 water*
Chrome, 2%	0.90	0.40	2.0	.....	.....	9,000	52	230,000	1450 water*
Chrome, 4%	0.90	0.40	4.0	.....	.....	9,500	60	270,000	1525 oil
Tungsten	0.60	0.40	.....	6.0	.....	10,500	60	300,000	1560 water
Cobalt, 20%	0.90	0.40	4.0	8.0	20.0	9,500	135	630,000	1740 oil
Cobalt, 38%	0.90	0.40	5.0	4.0	38.0	9,500	235	900,000	1740 oil

*Sometimes oil quenched.

New OPPORTUNITIES FOR STEEL USERS

Timken's advanced metallurgical thought and the advanced steel-making practice behind it are constantly opening up new opportunities for steel users to improve their products and, in many instances, to reduce their production costs as well.

Every steel problem comprises two parts: (A) functional requirements (B) fabricating requirements. The most satisfactory solution, generally speaking, is one which entails the least sacrifice in either.

Before making any steel recommendations, Timken technicians carefully study the conditions surrounding the handling and use of the material. Then they are in position to select a grade of Timken Steel that possesses the necessary chemical, metallurgical and metallographic properties, in correct balance, for the job.

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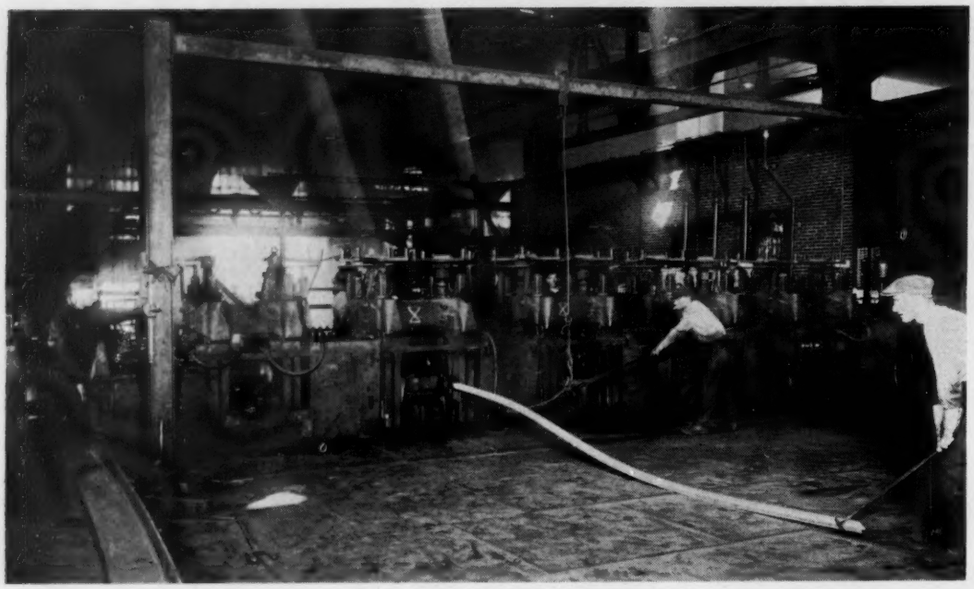
TIMKEN ALLOY STEELS

ELECTRIC FURNACE AND OPEN HEARTH - ALL STANDARD AND SPECIAL ANALYSES



ROLLING the hammer cogged billet of cobalt steel into bar stock

of the material after rolling is about 50 Rockwell C scale or 534 brinell. For cutting the bars, a rubber bonded wheel is used. Straightening of the bars is prohibited from the nature of the material.

In general, no heat treatment is employed. For hardening, the steel is quenched in oil from 1740 to 1750 degrees Fahr. When necessary to lower the hardness for certain purposes, a special anneal is employed which lowers the hardness about 100 points brinell.

One of the peculiarities of this magnet steel is that it is not "touched" after hot rolling, as a general rule. In hot working, it is necessary to heat the steel in as short a time as possible. Prolonged or intermittent heating reduces the potency of all magnet steels.

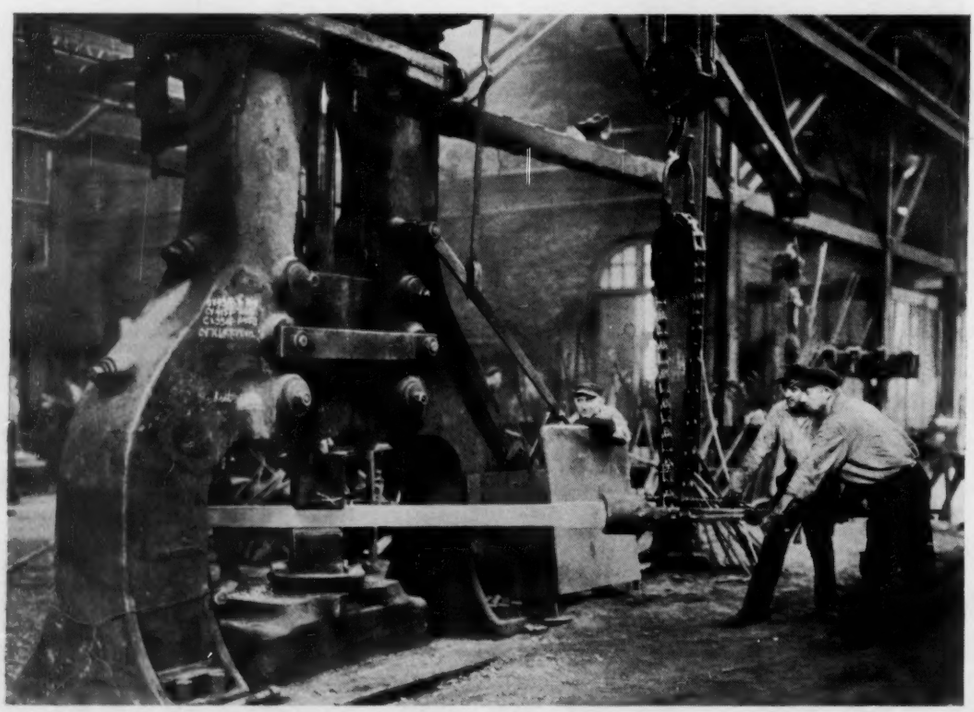
Space and Weight Are Factors

There are many uses for this special type of steel. Its higher magnetic properties make it possible to use it in a smaller space than the 4 per cent chromium steel, for example. But if space and weight are not factors, then the 4 per cent chromium type is satisfactory. Important uses for high-cobalt magnet steel are in airplane equipment, magnetos, phonograph pick-ups and scientific instruments.

Recently the company developed a successful technique and practice for producing castings of this 38 per cent cobalt magnet steel.

Chromium for Brittleness

In steels containing 0.05 per cent carbon and from 0.08 to 0.17 per cent phosphorus, brittleness resulting from phosphorus can be overcome by the addition of from 0.5 to 1.0 per cent chromium, according to a recent patent.



HAMMER cogging an ingot of cobalt magnet steel down to billet form

ADVERTISING PAGES REMOVED

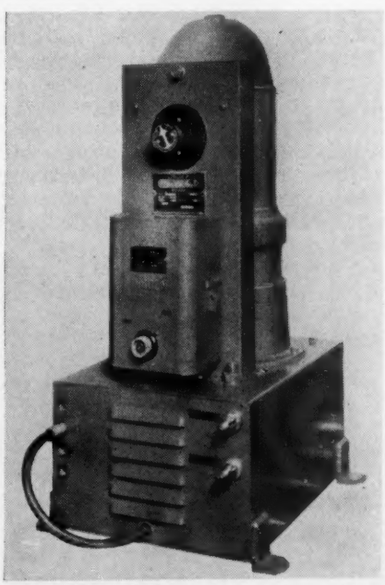
NEW EQUIPMENT

Arc Welding Machine—

Lincoln Electric Co., Cleveland, recently brought out a new small motor generator type of arc welding machine. The unit, shown herewith, is particularly suitable for service in sheet metal and fabricating shops and others called upon to weld thin gage materials. Known as the SA-100, this machine opens up an entirely new field of application for arc welding, since it delivers as low as 30 amperes at the arc without use of auxiliary devices.

The unit is of motor driven type, with a current range of 30 to 125 amperes. The generator is of single-operator variable voltage type with 100 ampere NEMA rating. Easy welding is assured by patented dual control which provides independent adjustment of open circuit voltage and welding current.

Motor installed is a "Linc-Weld" 5-horsepower squirrel cage induction type for across the line starting. A push button starter switch is employed. Wing nut cable terminals permit easy change of welding current polarity. The new welder is normally 220 or 440 volts and can be furnished for 110 or 550 volts, 3 or 2 phase, 60 and 50 cycles as desired. Connections are readily available for reconnecting from 220 to 440 volts, or vice versa.



Lincoln electric arc welder for use on light materials

◆ ◆ ◆

Miniature "C" Clamps—

Adjustable Clamp Co., 417 Ashland avenue, Chicago, recently announced a line of miniature "C" clamps having 1-inch depth of throat and opening 1 and 2 inches. Features include malleable iron frames, smoothly ground "foot," and cadmium plating. The steel screws have standard threads and are tipped with freely turning swivels deeply riveted.

◆ ◆ ◆

Mercury Vapor Lamp Fixtures—

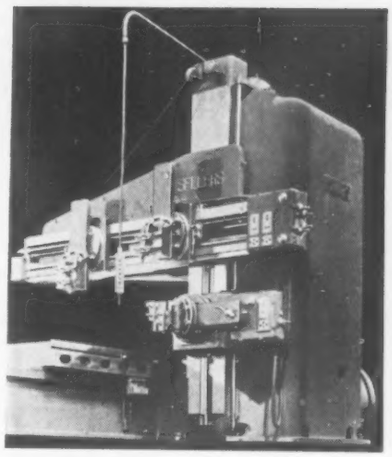
Benjamin Electric Mfg. Co., Des Plaines, Ill., has placed on the market a new line of mercury vapor lamp fixtures designed for general interior lighting and also for more special lighting of high narrow rooms. Essentially high intensity units, these fixtures, shown herewith, provide light that is diffused and directed properly. They are made with aluminum reflectors in both concentrating and spread types, and with porcelain enameled steel dome-shaped reflectors for a broader distribution of light and coverage of both horizontal and vertical surfaces. Both the aluminum and porcelain enamel fixtures use a standard 400-watt high intensity mercury vapor lamp.

Benjamin mercury vapor lamp fixture built for hard shop service

◆ ◆ ◆

Openside Planer—

Wm. Sellers & Co. Inc., Philadelphia, recently brought out an advanced design for openside planers as shown in the accompanying illustration of a 60-inch by 60-inch by 30-foot machine. There are no operating levers except those required for hand motions. All control is by means of built-in push buttons and switches.



Sellers 60-inch openside planer is completely electrified

Driving motor has 10 to 1 speed range providing cutting speed of 20 to 200 feet. The motor is rated at 100 horsepower at 40 feet per minute and above. Use of limit switches instead of master switch for automatic reversal has eliminated the necessity for any shifting levers or mechanism which were possible sources of trouble at high speed, the manufacturer declares.

All heads are equipped with electrically operated tool lifters built into the slides. Lifters are operated from the limit switches for reversing the table and may be engaged or disengaged by small tumbler switches located in the rheostat panel. Reels carry the cable from the top of the housing to the rail heads keeping the wire taut at all times so that it cannot get tangled or caught on the work.

One of the most novel features of this machine is the simplification of the feed and traverse mechanism by means of electrical apparatus. All the electrical parts are built into the mechanism boxes and not added on the outside. Switches and push buttons are in a compartment entirely

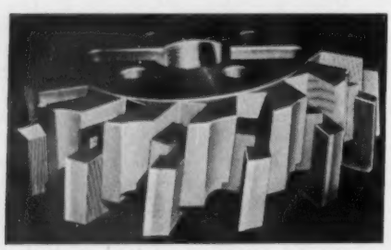
separated from the mechanical parts and covered with a stainless steel plate clearly marked with the functions of the various units. Each button or switch is geographically located so that it indicates the direction in which it moves the head.

♦ ♦ ♦

Zee Lock Face Milling Cutters—

Ingersoll Milling Machine Co., Rockford, Ill., has brought out a new zee lock cutter blade which is doubly adjustable, principally in the direction of major wear. As shown in the accompanying illustration, the blade is securely retained in the cutter housing by a zee-shaped wedge. The wedge hooks the front of the cutter body and the back of the blade, making it impossible for the blade to shift backwards or inwards away from the cut. Back hook of the wedge is on a slant so that when the cutter blade is reinserted and moved out a serration it moves forward slightly, compensating for the small amount of face wear.

The blade is designed to apply to many types of cutting tools. Medium duty cutters, using a blade ⅜-inch thick, with a blade spacing of about 1 inch are used for medium duty or finishing operations. The so-called heavy duty cutter, with a blade spacing of 1½ inches to 1¾ inches, using blades ½-inch thick, suffices for a general purpose cutter. For the heaviest of milling operations, an extra heavy duty cutter, with blades ¾-inch thick, spaced about 3 inches apart, is offered. Cutter bodies are made with the national standard



Ingersoll zee lock cutter blade is retained in housing by wedge

planer or flange nose drive, or to fit any milling machine or horizontal boring mill. Ingersoll face mills are furnished with the cutter blade of special selected forged high speed steel, super-cobalt high speed steel, J Metal Stellite, or tipped with cemented carbide.

♦ ♦ ♦

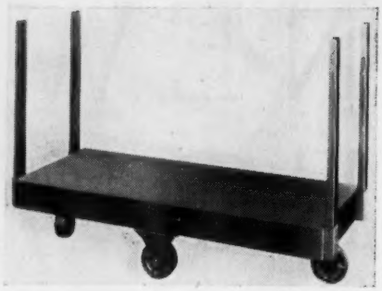
Pipeless Coolant Pump—

Ruthman Machinery Co., Cincinnati, has designed a new type of coolant pump which eliminates the use of piping in machine tools. Flow in the pump, shown herewith, is as follows: The intake supply flows into the pump by gravity through the opening provided in the mounting pad on the side of the machine. Discharge is transmitted directly into the base of the machine. The delivery pipe is connected independently to the inside wall of the reservoir in line with the discharge opening in the pump. The pipe can be installed by threading, caulking or expanding. Installation makes it possible to confine piping to the inside of the machine, and have the pump fastened independently with

Ruthman coolant pump has twin suction intakes

cap screws through the mounting bracket cast integral with the pump.

The pump operates in a vertical position and is driven by a built-in motor. Its capacity with a 1 horsepower motor operating at 1725 revolutions per minute is approximately 150 gallons per minute.



Stackbin platform truck constructed of one piece of sheet steel

All Steel Platform Trucks—

Stackbin Corp., Providence, R. I., is introducing all steel platform trucks designed for general factory use. The unit, shown herewith, is constructed of one piece of heavy gage sheet steel, formed into an inverted box section with undersides also formed inward and reinforced with four 4-inch steel channel struts, all electrically welded to make a unit that will retain its rigidity under any load.

Casters are of the pressed steel body type, welded to the underside of the chassis. Standard stakes are 2 inches by ½ by ⅛-inch channel, 27 inches long. Finish is battleship gray enamel, baked on.

♦ ♦ ♦

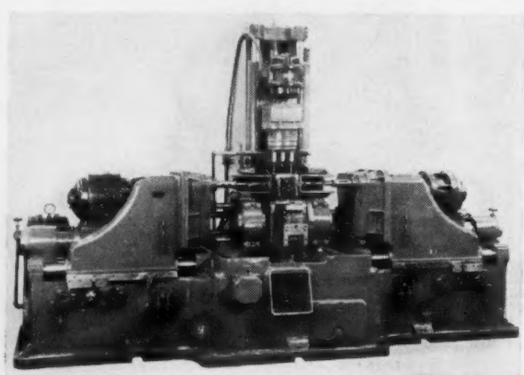
Three-Way Hydraulic Drilling And Reaming Machine—

Hammond Mfg. Co., 3089 East Eightieth street, Cleveland, recently developed a three-way hydraulic drilling and reaming machine, shown herewith. This unit was designed to drill and ream four large (approximately 1½-inch diameter) pin hole and to drill two (or three) small grouser holes in forged steel track shoes for a large tractor manufacturer. The operator, having loaded the front fixture while the tools were in operation, steps on a pedal to withdraw the turret lock bolt and indexes the 4-station turret toward him. When the turret has moved through 90 degrees the lock bolt snaps into engagement and automatically starts

♦

HAMMOND three-way hydraulic unit designed to drill and ream four large pin holes and to drill two (or three) small grouser holes in forged steel track shoes

♦



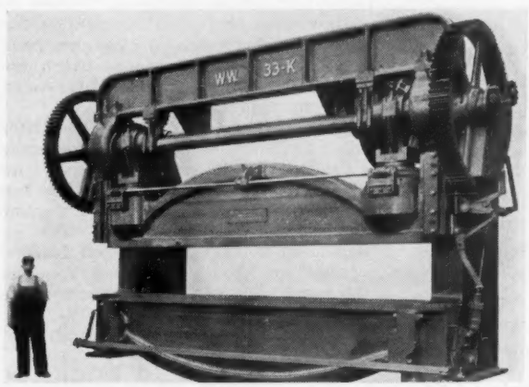
the three heads forward. Guide bars on the horizontal heads register with hardened bushings in the turret before the tools enter. Heads drop into feed at the proper point and are returned automatically at the completion of their feed.

All feed rates are easily adjustable. Tools run in hardened guide bushings. The box at the operator's left carries an emergency button for withdrawing all heads. While the machine now is tooled for a comparatively small shoe it can be converted to accommodate the largest shoe by changing the removable cluster heads and holding fixtures. Production of the machine is limited only by the amount of feed the tools will stand and is estimated at about 90 shoes gross per hour.

◆ ◆ ◆

Multiple Punch—

Williams, White & Co., Moline, Ill., recently introduced a No. 33-K multiple punch, essential characteristics of which include long stroke, high die space, long adjustment and overhanging ram. These features make it possible to use the unit, shown herewith,



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THIS No. 33-K multiple punch recently was developed by Williams, White & Co. to accommodate many different operations in a shop with widely varied products. The unit has a capacity of 250 tons

◆

with suitably designed dies, as a press brake, a plate shear, or for straight line or group punching operations.

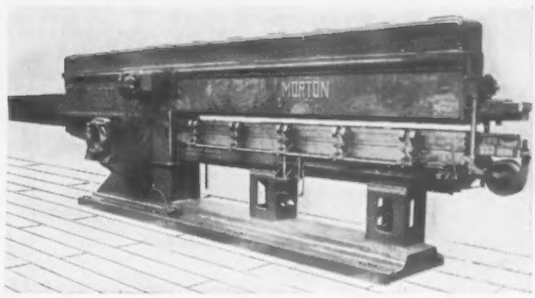
With the slide elevated to its uppermost position, the machine will accommodate maximum clearance braking dies that make it possible to perform the same operations on this machine that can be performed on the conventional type press brake. With the slide lowered to its lowest position, the machine will accommodate punching and shearing dies of conventional design.

The barrel type of adjustment used. Construction is such that the adjusting screws are not subjected to any other strain than compression at any part of the stroke. Adjustment of the ram is motor driven and is of the self-locking type.

◆ ◆ ◆

High-Duty Draw-Cut Flash Trimming Machine—

Morton Mfg. Co., Muskegon, Mich., has brought out a new high-duty,



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THE upper ram of this Morton flash trimming machine is raised and lowered by roller bearing eccentrics. Hardened steel-lined dies are secured to the ram housing member

◆

draw-cut flash trimming machine built especially for trimming the flash from butt welded sheets having a seam up to 120 inches in length. It also is designed to trim stock as thin as 20 gage. The upper arm of the machine, shown herewith, is provided with automatic compensation to take care of variation in metal thickness. This permits the trimming of a 20 or 16 gage metal without any change in tool setup.

Power is applied to the two reciprocating rams by means of direct connected reversing type motor. Cutting and return speed is approximately 60 feet per minute. A unique feature of the machine is the die cleaning and centering method. With the semi automatic operation of the machine the work unclamps as soon as the cutting rams reach the inward position the work can be removed while the rams are returning to their initial position. To insure the dies being free from dirt a special electrical timing device is applied which operates a solenoid valve, blowing a blast of air across the dies.

◆ ◆ ◆

Adjustable Spacing Collar for Milling Cutter Arbors—

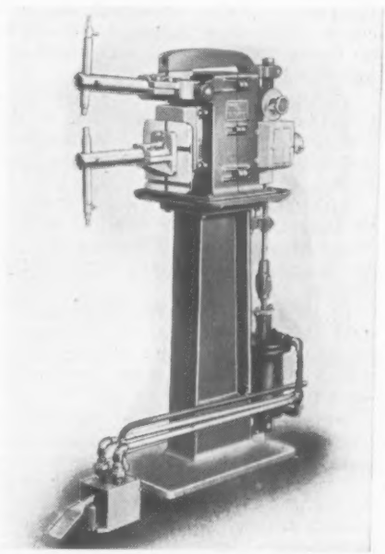
Dayton Rogers Mfg. Co., 1845 East Franklin, Minneapolis, is marketing an adjustable spacing collar for milling machine cutter arbors. The device is designed for accurate spacing of side milling cutters, gang milling, and various other multiple milling set-ups. This adjustable collar lends itself readily to close accurate work and may be adjusted by thousandths by merely loosening the cutter arbor nut. The collars are graduated in thousandths; however, a quarter thousandth graduation is easily obtained, the manufacturer declares.

◆ ◆ ◆

Electric Spot Welders—

Eisler Engineering Co., 768 South Thirteenth street, Newark, N. J., recently developed electric spot welders which utilize air pressure for closing the electrodes upon the work. Available in sizes from five to 75 kilovolt amperes and capable of welding metals up to 0.750-inch in thickness, these units, because of the particular design of the air cylinder, require a small volume of air for their efficient and economical operation.

Air pressures up to 80 pounds are employed, the pressure depending upon the size of welder used. An air operated spot welder of 20 kilovolt amperes capacity is shown in the illustration. Use of air operated welders not only relieve the operator of supplying the force to bring the electrodes together, but permit, by means of a regulating valve in the supply line, exact regulation of electrode pressure upon the work.



Eisler spot welder utilizes air pressure to close electrodes

Blast Furnace Gas Cleaning System

(*Concluded from Page 43*)

is the conditioning of the gas in the first stage so that the water vapor content of the gas is increased from 50 grains per cubic foot to 100 grains per cubic foot. In the cooling of the gases this water vapor must condense out on the dust nuclei.

When Milliken[3] determined the number of molecules in a gram molecule, or the Avogadro number (6.03×10^{23}) he used this method to obtain a dust free gas. In the process of the condensation of this water vapor an enormous wetted surface is formed; from physical chemical calculations this surface when condensing out 100 grains of water vapor will be equal to 87,500 square feet of wetted surface per cubic foot of gas.

In the cold stage the same physical changes take place. The dust content of the gas leaving any wet type of cleaner is always lower at the point of consumption than at the outlet of the cleaning apparatus. This, of course, is due to the loss of heat from the gas mains, which causes a lowering of the temperature of the gas, and the precipitation of additional water vapor in the gas upon the dust nuclei. The ratio of the condensable water vapor to the dust in the gas coming from the hot stage is much larger than the ratio existing in the clean cold gas flowing through the mains. The ratio is about 100 grains of water vapor to 0.05-grain of dust or 2000 parts of condensable water vapor to 1 part of dust. The condensing and cooling elements of the second stage consist of two banks of static hurdles, and the final cleaning and cooling element is a Bassler rotor.

The total power requirements of this gas cleaning and sludge recovery system will be less than 2 kilowatts per 1000 cubic feet of gas per minute. This will cover all power for pumping, driving rotor and power used in producing a sludge of 50 per cent water by weight. The total water consumption will be less than 22 gallons per 1000 cubic feet of gas and the waste water will not have more than 10 grains of solids in suspension. The fine cleaned gas will have less than 0.015-grain of dust per cubic foot at standard conditions and less than 0.1 grain of entrained moisture.

[3]Physical Review, 1913, page 220.

New Trade Publications

PUMPS—Worthington Pump & Machinery Corp., Harrison, N. J., in bulletin W-323-B3 describes its self-priming centrifugal monobloc pumping units.

GRINDING—Patterson Foundry & Machine Co., East Liverpool, O., in a current bulletin explains advantages of its Porox 66 in grinding mill liners and grinding balls.

TUBE BENDER—Parker Appliance Co., Cleveland, in bulletin No. 39 describes its production tube bender, with instructions and price list. It is illustrated.

BRAZING FLUX—Handy & Harman, 82 Fulton street, New York, in bulletin No. 9 describes a new brazing flux for low-temperature brazing, liquid at 1200 degrees Fahr.

PLATING BARREL—Udylite Co., 1651 Grand boulevard, Detroit, has issued a bulletin on its plating barrel, fully illustrated to show details and with full description.

PYROMETER — Brown Instrument Co., Wayne and Roberts avenues, Philadelphia, in a current bulletin features its potentiometer pyrometer for regulation of temperature in many lines of industry.

NIROSTA STEELS — Firth-Sterling Steel Co., McKeesport, Pa., has issued a bulletin on its Nirosta steels in various types, showing physical properties and working data. Other stainless steels are also described.

WELDING—Lincoln Electric Co., Cleveland, has issued plate No. 49 of its series on arc welding of tier buildings. It is devoted to fixed end connections, beams to columns. The subject is treated uniformly with previous plates.

TACKS, NAILS—Republic Steel Corp., Youngstown, O., has issued a catalog of tacks and cut nails from its Grand Crossing works at Chicago. Emphasis is placed on quality and uniformity and the new packages and cartons.

LABORATORY CRUSHERS—American Pulverizer Co., 1249 Macklind avenue, St. Louis, has issued a bulletin on its small crushers for laboratory use in grinding various materials. It is illustrated and construction features are shown.

GEAR FINISHER — National Tool Co., Madison avenue and West 112th street, Cleveland, has issued a bulletin on its new tool for burnishing and shaving in one operation. It is illustrated and charts show accuracy of work.

SHEET METAL SPECIFICATIONS—American Rolling Mill Co., Middletown, O., has issued a folder, No. 12 C3, on suggestions for galvanized sheet metal specifications, designed to be of value to the sheet metal contractor and architect as well as the plant owner.

CONDENSATE UNITS—Bulletin No. 260-B14 has been issued by the Roots-Connersville Blower Corp., Connersville, Ind., on its condensate units for heating systems and boiler feed service, built in a range from 2000 to 70,000 square feet of radiation.

PIPE TOOLS—Beaver Pipe Tools Inc., Warren, O., is circulating a leaflet containing technical information of value to users and sellers of pipe tools. A form of specification for bidding on portable pipe and bolt threading machines has also been prepared by this company for use of buyers.

STOKERS—Link-Belt Co., 2410 West Eighteenth street, Chicago, has issued two folders on its underfeed screw-type stokers in sizes up to 300 B. H. P. No. 1459 quotes figures to show reduction in steam costs, and No. 1458 has figures to show a profit from the steam plant using these stokers.

TWIST DRILLS—Edgar Allen & Co. Ltd., Sheffield, 9, England, has issued a bulletin on its line of twist drills, calling attention to its special and standard drills of all types. Another bulletin is devoted to permanent magnets, with charts showing comparison of the various steels used for permanent magnets.

FURNACES — Surface Combustion Corp., Toledo, O., has issued a number of bulletins on various types of furnaces for special purposes. These include special controlled atmosphere furnaces, direct gas-fired air heaters, hardening and drawing furnaces, batch gas-carburizing furnaces and heat treatment of spring leaves.

CATERPILLAR TRACTORS—Caterpillar Tractor Co., Peoria, Ill., has issued a condensed catalog of its complete line of tractors, track-type, blade graders, elevating graders, road maintenance machines, terracers, power units and industrial units. Construction features, application data, condensed specifications and a list of attachments are given for each machine.

Great Lakes Red Book for 1935 Is Now Available

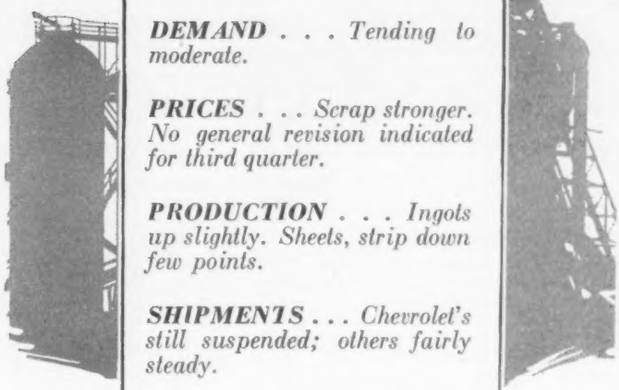
Many changes of major importance to the Great Lakes shipping industry are listed in the 1935 *Great Lakes Red Book*, just published. This vest pocket directory of vessels, owners, operators, captains and engineers is in its thirty-second annual edition, published at Cleveland, by *Marine Review*, under the direction of A. H. Jansson, editor.

In addition to names of more than 1500 vessels registered on the Great Lakes, with information about owners, operators, captains and engineers, the Red Book contains a complete directory of ship building yards with executive personnel and other pertinent information. A complete alphabetical list of all ships, an index to the capacity of ore carriers, and a complete port directory also are included.

The Red Book is obtainable through STEEL, 1213 West Third street, Cleveland, for $1 postpaid.

Ingot Rate Rallies Slightly; Markets Quieter

Motorcar Requirements Off; Price Extensions Indicated for 3rd Quarter



MARKET IN TABLOID

DEMAND *. . . Tending to moderate.*

PRICES *. . . Scrap stronger. No general revision indicated for third quarter.*

PRODUCTION *. . . Ingots up slightly. Sheets, strip down few points.*

SHIPMENTS *. . . Chevrolet's still suspended; others fairly steady.*

NOTWITHSTANDING a sharp decline in automobile output, and due mainly to recent awards for government projects, steelworks operations last week reversed the recent trend and advanced ½-point to 44½ per cent.

That Chevrolet not only expects to get back into production shortly, but also to recoup some of its loss, is indicated by releases to manufacture materials and parts, with instructions to hold them ready for immediate shipment.

This, in itself, however, was not a determining factor, as sheet and strip output showed further recessions; full-finished sheets down 2 points to 56 per cent; strip, 3 to 44. Total automobile assemblies for the week were 87,000, compared with 110,000 in the preceding week, lowest since the week ended March 9. General Motors' was off about 18,000 units, Ford 5000.

Little change was noted in the labor situation as it pertained to iron and steel. Strike threats were aimed at some eastern shipyards and at the Lake Superior iron ore industry, and even one or two of the steel plants, but in general steelmakers considered these demonstrations as a gesture to coerce congress on the Wagner and 30-hour labor bills. In industries unhampered by labor difficulties production has been going along at a fairly steady rate. Tin plate mills increased operations 5 points to 80 per cent. Tractor plants are working on heaviest schedules since 1929.

Steelmakers are confronted with one of the most difficult price problems since they adopted a code—what to do May 21 for third quarter. Penalized by freight surcharges, affecting as many as five tons of raw materials for one ton of some finished steel products, they feel they would be justified in at least a moderate increase.

But after four months' operations in the profit zone they now face the prospect of slowly declining activity until the government's work gets under way in the fall—unlike last year when steelworks operations at this time were at a strong 60 per cent.

If prices are advanced, it is believed relatively few products will be adjusted, and not sufficiently to cause much speculative buying. Consumers undoubtedly would be determined to hold off to see if the price-control provision in the code is abolished when NRA expires June 16.

Under the first allotment made by the President's advisory committee, $400,000,000 of the $4,800,000,000 works relief money has been set aside for highways and grade crossings, tending to promote early action on many projects. Last week only 7625 tons of shapes were placed.

Erie railroad placed 20,000 tons of rails and accessories. Rail purchases this year have amounted to 182,995 tons, little more than two-thirds tonnage in the same period in 1934, when the government was urging loans on the carriers. Domestic freight car orders last month, 350, brought the total for four months to 1180, compared with 20,707 in the first four last year.

Despite short-range fluctuations, steel ingot production for four months this year, 11,013,306 gross tons, holds its 12 per cent gain over the comparable period in 1934, this percentage being almost identical with the increase the full year 1934 showed over 1933. Daily average output in April, 100,243 tons, as well as the total for the month, 2,606,311 tons, was 7.9 per cent below March.

Steelworks operations in the Chicago district last week advanced 1½ points to 52½; New England 16 to 46; Buffalo 3 to 30; Wheeling 2 to 81. Pittsburgh was down 1 to 36; Cleveland 3 to 51; eastern Pennsylvania ½-point to 28. Youngstown held 50; Detroit 82; Birmingham 54½.

STEEL's iron and steel price composite is up 4 cents to $32.34; the scrap index has risen 29 cents to $10.29, while the finished steel composite remains $54.

COMPOSITE MARKET AVERAGES

	May 11	May 4	April 27	One Month Ago April, 1935	Three Months Ago Feb., 1935	One Year Ago May, 1934	Five Years Ago May, 1930
Iron and Steel	$32.34	$32.30	$32.30	$32.29	$32.54	$32.97	$33.49
Finished Steel	54.00	54.00	54.00	54.00	54.00	54.80	52.60
Steelworks Scrap	10.29	10.00	9.92	10.05	12.03	11.30	13.65

Iron and Steel Composite:—Pig iron, scrap, billets, sheet bars, wire rods, tin plate, wire, sheets, plates, shapes, bars, black pipe, rails, alloy steel, hot strip, and cast iron pipe at representative centers. Finished Steel Composite:—Plates, shapes, bars, hot strip, nails, tin plate, pipe. Steelworks Scrap Composite:—Heavy melting steel and compressed sheets.

A COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

Finished Material

	May 11, 1935	April, 1935	Feb., 1935	May, 1934
Steel bars, Pittsburgh	1.80c	1.80c	1.80c	1.90c
Steel bars, Chicago	1.85	1.85	1.85	1.95
Steel bars, Philadelphia	2.11	2.09	2.09	2.19
Iron bars, Terre Haute, Ind.	1.75	1.75	1.75	1.75
Shapes, Pittsburgh	1.80	1.80	1.80	1.85
Shapes, Philadelphia	2.01½	2.00½	2.00½	2.05½
Shapes, Chicago	1.85	1.85	1.85	1.90
Tank plates, Pittsburgh	1.80	1.80	1.80	1.85
Tank plates, Philadelphia	2.00	1.98½	1.98½	2.03½
Tank plates, Chicago	1.85	1.85	1.85	1.90
Sheets, No. 10, hot rolled, Pitts.	1.85	1.85	1.85	2.00
Sheets, No. 24, hot ann., Pitts.	2.40	2.40	2.40	2.65
Sheets, No. 24, galvan., Pitts.	3.10	3.10	3.10	3.25
Sheets, No. 10, hot rolled, Gary	1.95	1.95	1.95	2.10
Sheets, No. 24, hot anneal., Gary	2.55	2.55	2.55	2.75
Sheets, No. 24, galvan., Gary	3.20	3.20	3.20	3.35
Plain wire, Pittsburgh	2.30	2.30	2.30	2.30
Tin plate, per base box, Pitts.	5.25	5.25	5.25	5.25
Wire nails, Pittsburgh	2.60	2.60	2.60	2.60

Semifinished Material

Sheet bars, open-hearth, Youngs.	$28.00	$28.00	$28.00	$30.00
Sheet bars, open-hearth, Pitts.	28.00	28.00	28.00	30.00
Billets, open-hearth, Pittsburgh	27.00	27.00	27.00	29.00
Wire rods, Pittsburgh	38.00	38.00	38.00	38.00

Pig Iron

	May 11, 1935	April, 1935	Feb., 1935	May, 1934
Bessemer, del. Pittsburgh	$19.81	$19.76	$19.76	$19.76
Basic, Valley	18.00	18.00	18.00	18.00
Basic, eastern, del. eastern Pa.	19.76	19.76	19.76	19.76
No. 2, foundry, del. Pittsburgh	19.31	19.26	19.26	19.26
No. 2 foundry, Chicago	18.50	18.50	18.50	18.50
Southern No. 2, Birmingham	14.50	14.50	14.50	14.50
No. 2X eastern, del. Philadelphia	20.68	20.63	20.63	20.63
Malleable, Valley	18.50	18.50	18.50	18.50
Malleable, Chicago	18.50	18.50	18.50	18.50
Lake Superior charcoal, del. Chi.	24.25	24.15	24.04	24.04
Ferromanganese, del. Pittsburgh	90.13	89.89	89.79	90.24
Gray forge, del. Pittsburgh	18.67	18.63	18.63	18.88

Scrap

Heavy melting steel, Pittsburgh	$12.00	$11.70	$13.25	$12.80
Heavy melt. steel, No. 2, east. Pa.	9.25	9.15	10.12	8.90
Heavy melting steel, Chicago	10.25	10.05	11.65	10.85
Rails for rolling, Chicago	11.00	11.05	12.55	12.15
Railroad steel specialties, Chicago	11.25	11.25	12.50	12.40

Coke

Connellsville, furnace, ovens	$3.60	$3.60	$3.60	$3.45
Connellsville, foundry, ovens	4.60	4.60	4.60	4.60
Chicago, by-product foundry, del.	9.25	9.25	9.25	9.25

Steel, Iron, Raw Material, Fuel and Metals Prices

Prices are code levels filed with American Iron and Steel Institute, 350 Fifth avenue, New York. Except when otherwise designated, prices are base, f.o.b. cars. Asterisk denotes price change this week.

Sheet Steel

Hot Rolled No. 10, 24-48 in.

Pittsburgh	1.85c
Gary	1.95c
Chicago, delivered	1.98c
New York, del.	2.20c
Philadelphia, del.	2.16c
Birmingham	2.00c
St. Louis, del.	2.17c
Pacific ports, f.o.b. cars, dock	2.40c

Hot Rolled Annealed No. 24

Pittsburgh	2.40c
Gary	2.50c
Chicago, delivered	2.53c
Detroit, delivered	2.60c
New York, del.	2.75c
Philadelphia, del.	2.71c
Birmingham	2.55c
St. Louis, del.	2.72c
Pacific ports, f.o.b. cars, dock	3.05c

Galvanized No. 24

Pittsburgh	3.10c
Gary	3.20c
Chicago, delivered	3.23c
Philadelphia, del	3.41c
New York, del.	3.45c
Birmingham	3.25c
St. Louis, del.	3.42c
Pacific ports, f.o.b. cars, dock	3.70c

Tin Mill Black No. 28

Pittsburgh	2.75c
Gary	2.85c
St. Louis, delivered	3.07c

Cold Rolled No. 10

Pittsburgh	2.50c
Gary	2.60c
Detroit, delivered	2.70c
Philadelphia, del.	2.81c
New York, del.	2.85c
Pacific ports, f.o.b. cars, dock	3.10c

Cold Rolled No. 20

Pittsburgh	2.95c
Gary	3.05c
Detroit, delivered	3.15c
Philadelphia, del.	3.26c
New York, del.	3.30c

Enameling Sheets

Pittsburgh, No. 10	2.50c
Pittsburgh, No. 20	3.10c

Tin and Terne Plate

Gary base, 10 cents higher.

Tin plate, coke base	
con. (box) Pitts.	$5.25
Do., waste-waste	2.75c
Do., strips	2.50c
Long ternes, No. 24 unassorted, Pitts.	3.40c
Do., Gary	3.50c

Corrosion and Heat-Resistant Alloys

Pittsburgh base, cents per lb.

Chrome-Nickel

	No. 302	No 304
Bars	23.00	24.00
Plates	26.00	28.00
Sheets	33.00	35.00
Hot strip	20.75	22.75
Cold strip	27.00	29.00

Straight Chromes

	No. 410	No. 430	No. 442	No. 446
Bars	17.00	18.50	21.00	26.00
Plates	20.00	21.50	24.00	29.00
Sheets	25.00	28.00	31.00	35.00
Hot strip	15.75	16.75	21.75	26.75
Cold stp.	20.50	22.00	27.00	35.00

Steel Plates

Pittsburgh	1.80c
New York, del.	2.09c
Philadelphia, del.	1.99c
Boston, delivered	2.22c
Buffalo, delivered	2.05c
Chicago or Gary	1.85c
Cleveland, del.	1.99½c
Birmingham	1.95c
Coatesville, base	1.90c
Sparrows Pt., base	1.90c
Pacific ports, f.o.b. cars, dock	2.35c
St. Louis, delivered	2.07c

Structural Shapes

Pittsburgh	1.80c
Philadelphia, del.	2.01½c
New York, del.	2.06½c
Boston, delivered	2.20½c
Bethlehem	1.90c
Chicago	1.85c
Cleveland, del.	2.00c
Buffalo	1.90c
Gulf Ports	2.20c
Birmingham	1.95c
Pacific ports, f.o.b. cars, dock	2.35c

Bars

Soft Steel

Pittsburgh	1.80c
Chicago or Gary	1.85c
Duluth	1.95c
Birmingham	1.95c
Cleveland	1.85c
Buffalo	1.90c
Detroit, delivered	1.95c
Pacific ports, f.o.b. cars, dock	2.35c
Philadelphia, del.	2.11c
Boston, delivered	2.22c
New York, del.	2.15c
Pitts., forg. qual.	1.95c-2.05c

Rail Steel

To Manufacturing Trade

Pittsburgh	1.70c
Chicago or Gary	1.75c
Moline, Ill.	1.75c
Cleveland	1.75c
Buffalo	1.80c

Iron

Troy, N. Y.	1.70c
Terre Haute, Ind.	1.75c
Chicago	1.80c
Philadelphia	1.91c
Pittsburgh, refined	2.75-7.50c

Reinforcing

New billet, straight lengths, quoted by distributors.

Pittsburgh	2.05c
Chicago, Gary, Buffalo, Cleve., Birm., Young	2.10c
Gulf ports	2.45c
Pacific coast ports f.o.b. cars dock	2.45c
Philadelphia, del.	2.36c

Rail Steel

Straight lengths quoted by distributors

Pittsburgh	1.90c
Chicago, Buffalo, Cleveland, Birm., Young.	1.95c
Gulf ports	2.30c

Wire Products

(Prices apply to straight or mixed carloads; pool cars, or less, 15c up. 10% dis. on nail extras on stright or mixed carloads to one consignee.)

Base Pitts.-Cleve. 100 lb. keg.

Standard wire nails	$2.60
Cement coated nails	2.60
Galvanized nails, 15 gage and coarser	4.60c
do., 16 gage and finer	5.10c

(Per pound)

Polished staples	3.30c
Galvanized fence staples	3.55c
Barbed wire, galv.	3.00c
Annealed fence wire	2.45c
Galvanized fence wire	2.80c
Woven wire fencing (base column, c.l.)	$63.00
Plain wire, 6-9 gage to mfg. trade	2.30c

Anderson, Ind., (merchant products only) and Chicago up $1; Duluth up $2; Birmingham up $3.

Spring wire, Pittsburgh or Cleveland	2.90c

Do., Chicago up $1, Worcester, $2.

Cold-Finished Carbon Bars and Shafting

Base Pitts., one size, shape, grade, shipment at one time to one destination

10,000 to 19,999 lbs	1.95c
20,000 to 59,999 lbs.	1.90c
60,000 to 99,999 lbs.	1.85c
100,000 lbs. and over	1.82½c

Gary, Ind., Cleveland, up 5c; Buffalo, up 10c; Detroit, up 20c; eastern Michigan, up 25c.

Alloy Steel Bars (Hot)

Pittsburgh, Buffalo, Chicago, Massillon, Canton, Bethlehem	2.45c

Alloy S.A.E.	Diff.	Alloy S.A.E.	Diff.
2000	0.25	3100	0.55
2100	0.55	3200	1.35
2300	1.50	3300	3.80
2500	2.25	3400	3.20

4100 0.15 to 0.25 Mo....0.50
4600 0.20 to 0.30 Mo. 1.25-1.75 Ni....1.05
5100 0.80-1.10 Cr....0.45
5100 Cr. spring....base
6100 bars....1.20
6100 spring....0.70
Cr., Ni., Van....1.50
Carbon Van....0.95
9250....Carbon base plus extras

Piling

Pittsburgh	2.15c
Chicago, Buffalo	2.25c

Strip and Hoops

Hot strip to 23½-in.

Pittsburgh	1.85c
Chicago, base	1.95c
Birmingham base	2.00c
Detroit, delivered	2.05c
Philadelphia, del.	2.16c
New York, del.	2.20c
Cooperage hoop, Pittsburgh	1.95c
Chicago	2.05c
Cold-rolled strip, Pitts., Cleve.	2.60c
Worcester, Mass.	2.80c

Rails, Track Material

(Gross Tons)

Standard rails, mill	$36.37½
Relay rails, Pitts. 24-45 lbs.	$26.00
50-60 lbs.	$23.00
70-75 lbs.	$20.00
80-85 lbs.	$24.00
100 lbs.	$25.00
Light rails, billet qual. Pitts., Chi.	$35.00
Do., reroll. qual.	34.00
Angle bars, billet, Gary, Ind., So. Chi.	2.55c
Do., axle steel	2.10c
Spikes, R. R. base	2.40c
Track bolts, base	3.55c
Tie plates, base	1.90c

Base, light rails 25 to 40 lbs.; 50 to 60 lbs. inclusive up $5; 16 and 20 lbs., up $1; 12 lbs. up $8; 8 and 10 lbs., up $5. Base railroad spikes 200 kegs or more; base tie plates 20 tons.

Bolts and Nuts

Pittsburgh, Cleveland, Birmingham, Chicago. Discounts to legitimate trade for all case lots, Dec. 1, 1932, lists, 10% extra for less full containers.

Carriage Bolts

All sizes, cut thread	70-10-5 off
Rolled thread, ½ x 6, smaller	70-10-5 off

Machine Bolts

All sizes cut thread lag screws, plow bolts, Nos. 1-2-3-7 heads, tap bolts, blank bolts stud bolts	70-10-5 off
Tire bolts	60-5 off
Stove bolts, 75 off in pkgs.; 83 off on 15,000 of 3-inch and shorter, or 5000 over 3-inch.	
Rolled thread machine, ½ x 6, smaller	70-10-5 off
Step bolts	70-5 off
Elevator bolts	70-5 off

Nuts

S.A.E. semifinished hex.; ½ to ⅞-inch	70-10-5 off
Do., ½ to 1-inch	70-10-5 off
Do., over 1-inch	70-5 off

Hexagon Cap Screws

Milled	85 off
*Upset, 1-in., smaller	87½ off

Square Head Set Screws

*Upset, 1-in., smaller	80 off
Headless set screws	75 off

Rivets, Wrought Washers

Struc., c. l., Pittsburgh, Cleveland	2.90c
Struc., c. l., Chicago	3.00c
⅞-in. and smaller, Pitts., Chi., Cleve.	70 and 5 off
Wrought washers, Pitts., Chi., Phila., to jobbers & large nut, bolt mfrs.	$6.25 off

Cut Nails

Cut nails, Pitts.; (10% discount on size extras)	$2.75
Do. less carloads, 5 kegs or more no discount on size extras	$3.05
Do. under 5 kegs; no discount on size extras	$3.20

Pipe and Tubing

Base $200 net ton, except on standard commercial seamless boiler tubes under 2 inches and cold drawn seamless tubing.

Welded Iron, Steel Pipe

Base discounts on steel pipe, Pitts., Lorain, O., to consumers in carloads. Gary, Ind., 2 points less. Chicago delivered 2½ points less. Wrought pipe, Pittsburgh base.

Butt Weld

In.	Blk.	Gal.
Steel		
¼ and ⅜	53½	35
½	58½	47
¾	62	52
1—3	64	55
Iron		
½	31½	15
¾	36½	20½
1—1¼	39½	25½
2	41½	26

Lap Weld

Steel		
2	60	51
2½—3	63	54
3½—6	65	56
7 and 8	64	54
9 and 10	63½	53½
Iron		
2	37	22½
2½—3½	38	25
4—8	40	28½

Line Pipe

Steel	
½, butt weld	57½
⅛-inch, butt weld	50½
¼—⅜, butt weld	52½
¾, butt weld	61
1—3, butt weld	63
2-inch, lap weld	59
2½—3, lap weld	62
3½—6, lap weld	64
7—8, lap weld	63
Iron	

⅛—1½ inch, black and galv. take 4 pts. over; 2½—6 inch 2 pts. over discounts for same sizes, standard pipe lists, 8—12-inch, no extra.

Boiler Tubes

C. L. Discounts, f.o.b. Pitts.

Lap Weld Steel		*Charcoal Iron*	
2—2¼	33	1¾	8
2½—2¾	40	2—2¼	13
3	47	2½—2¾	16
3¼—3½	50	3	17
4	52	3¼—3½	18
4½—5	42	4	20
		4½	21

In lots of a carload or more, above discounts subject to preferential of two 5% and one 7½% discount on steel and 10% on charcoal iron.

Lapwelded steel: 200 to 9999 pounds, ten points under base, one 5% and one 7½%. Under 2000 pounds 15 points under base, one 5% and one 7½%. Charcoal iron: 10,000 pounds to carloads, base less 5%; under 10,000 lbs., 2 points under base.

Seamless Boiler Tubes

Under date of May 15 in lots of 40,000 pounds or more for cold-drawn boiler tubes and in lots of 40,000 pounds or feet or more for hot-finished boiler tubes, revised prices are quoted for 55 cold-drawn boiler tube sizes ranging from ¼ to 6-inch outside diameter in 30 wall thicknesses, decimal equivalent from 0.035 to 1.000, on a dollars and cents basis per 100 feet and per pound.

Hot-finished carbon steel boiler tube prices also under date of May 15 range from 1 through 7 inches outside diameter, inclusive, and embrace 47 size classifications in 22 decimal wall thicknesses ranging from 0.109 to 1.000, prices also being on a lb. and 100 ft. basis.

Seamless Tubing

Cold drawn; f.o.b. mill disc.

100 ft. or 150 lbs.	32%
15,000 ft. or 22,500 lbs.	70%

Cast Iron Water Pipe

Class B Pipe—Per Net Ton

6-in. & over, Birm.	$39.00-40.00
4-in., Birmingham	42.00-43.00
4-in., Chicago	50.40-51.40
6 to 24-in. Chicago	47.40-48.40
6-in. & over, east fdy.	43.00
Do., 4-in.	46.00

Class A pipe $3 over Class B.

Stnd. fitgs., Birm. base	$100.00

Semifinished Steel

Billets and Blooms

4 x 4-inch base; gross ton

Pitts., Chi., Cleve., and Youngstown	$27.00
Philadelphia	32.67
Duluth	31.00
Forging, Pitts., Chi. and Buffalo	32.00
Forging, Duluth	36.00

Sheet Bars

Pitts., Cleve., Young., Chi., Buff., Canton, Sparrows Pt.	28.00

Slabs

Pitts., Cleve., Young.	27.00

Wire Rods

(Common; combination up $2)

Pitts., Cleveland	38.00
Chicago	39.00
Worcester, Mass.	40.00

Skelp

Pitts., Chi., Young., Buff., Coatesville, Sparrows Point	1.70c

Coke

Price Per Net Ton

Beehive Ovens

Connellsville, fur.	$3.60
Connellsville, fdry.	4.60
Connel. prem. fdry.	5.10
New River fdry.	6.00
Wise county fdry.	4.45- 5.25
Wise county fur.	4.00- 4.50

By-Product Foundry

Newark, N. J., del.	9.20- 9.65
Chi., ov., outside del.	8.50
Chicago, del.	9.25
New England, del.	11.00
St. Louis, del.	9.25
Birmingham, ovens	6.00
Indianapolis, del.	8.75
Cincinnati, del.	9.30
Cleveland, del.	9.25
Buffalo, ovens	7.50- 8.00
Detroit ov., out. del.	8.50
Philadelphia, del.	9.03

Coke By-Products

Per gallon, producers' plants.

Tank lots	Spot
Pure and 90% benzol	15.00c
Toluol	30.00c
Solvent naphtha	30.00c
Commercial xylol	30.00c

Per lb. f.o.b. New York.

Phenol (200 lb. drums)	16.30c
Do. (100 lbs.)	17.30c

Eastern Plants, per lb.

Naphthalene flakes and balls, in bbls.	5.00c

Per 100 lb. Atlantic seaboard

Sulphate of ammonia	$1.20

†Western prices, ½-cent up.

Pig Iron

Delivered prices include switching charges only as noted. No. 2 foundry is 1.75-2.25 sil.; 25c diff. for each 0.25 sil. above 2.25; 50c diff. for each 0.25 below 1.75. Gross tons.

Basing Points:	No. 2 Fdry.	Malleable	Basic	Bessemer
Bethlehem, Pa.	$19.50	$20.00	$19.00	$20.50
Birdsboro, Pa.	19.50	20.00	19.00	20.50
Birmingham, Ala., southern del.	14.50	14.50	13.50	19.00
Buffalo	18.50	19.00	17.50	19.50
Chicago	18.50	18.50	18.00	19.00
Cleveland	18.50	18.50	18.00	19.00
Detroit	18.50	18.50	18.00	19.00
Duluth	19.00	19.00	.....	19.50
Erie, Pa.	18.50	19.00	18.00	19.50
Everett, Mass.	19.50	20.00	19.00	20.50
Hamilton, O.	18.50	18.50	18.00	19.00
Jackson, O.	20.25	20.25	19.75	.....
Neville Island, Pa.	18.50	18.50	18.00	19.00
Provo, Utah	17.50	.....	17.00	.....
Sharpsville, Pa.	18.50	18.50	18.00	19.00
Sparrows Point, Md.	19.50	.....	19.00	.....
Swedeland, Pa.	19.50	20.00	19.00	20.50
Toledo, O.	18.50	18.50	18.00	19.00
Youngstown, O.	18.50	18.50	18.00	19.00
Delivered from Basing Points:				
Akron, O., from Cleveland	19.76	19.76	19.26	20.26
Baltimore from Birmingham	20.80	.....	19.96	.....
Boston from Birmingham	19.62	.....	19.50	.....
Boston from Everett, Mass.	20.00	20.50	19.50	21.00
Boston from Buffalo	20.00	20.50	19.50	21.00
Brooklyn, N. Y., from Bethlehem	21.93	22.43	.....	.....
Brooklyn, N. Y., from Bmghm.	21.55	.....	.....	.....
Canton, O., from Cleveland	19.76	19.76	19.26	20.26
Chicago from Birmingham	†18.72	.....	18.60	.....
Cincinnati from Hamilton, O.	19.51	19.51	19.01	.....
Cincinnati from Birmingham	19.38	.....	19.40	.....
Cleveland from Birmingham	19.04	.....	18.92	.....
Indianapolis from Hamilton, O.	20.93	20.93	20.43	21.43
Mansfield, O., from Toledo, O.	20.26	20.26	19.76	20.76
Milwaukee from Chicago	19.57	19.57	19.07	20.07
Muskegon, Mich., from Chicago, Toledo or Detroit	21.60	21.60	21.10	22.10
Newark, N. J., from Birmingham	20.61	.....	.....	.....
Newark, N. J., from Bethlehem	20.99	21.49	.....	.....
Philadelphia from Birmingham	19.93	.....	19.81	.....
Philadelphia from Swedeland, Pa.	20.31	20.81	19.81	.....
*Pittsburgh district from Neville Island	Neville base plus 67c, 81c and $1.21 switching charges			
Saginaw, Mich., from Detroit	20.75	20.75	20.25	20.25

Delivered from Basing Points:	No. 2 Fdry.	Malleable	Basic	Bessemer
St. Louis, northern	19.00	19.00	18.50	.....
St. Louis from Birmingham	†18.62	.....	18.50	.....
St. Paul from Duluth	20.94	20.94	.....	21.44

†Over 0.70 phos.

Low Phos

Basing Points: Birdsboro and Steelton, Pa., and Standish, N. Y., $23.50. Phila. base, standard and copper bearing, $24.63.

Gray Forge

Valley furnace 18.00
Pitts. dist. fur. 18.00

Charcoal

Lake Superior fur. 21.00
Do., del. Chicago 24.25
Lyle, Tenn. 21.50

Silvery†

Jackson County, O., base; 6% $22.75; 7—$23.75; 8—$24.75; 9—$25.70; 10—$26.75; 11—$27.75. Buffalo base prices, up $1.25.

Bessemer Ferrosilicon†

Jackson County, O., base; 10%—$27.75; 11—$28.75; 12—$30.25; 13—$31.75; 14—$33.25; 15—$34.75; 16—$36.25. Buffalo base prices $1.25 higher.

†The lower all-rail delivered price from Jackson, O., or Buffalo is quoted with freight allowed.

Refractories

Per 1000 f.o.b. Works

Fire Clay Brick

First Quality.

Pa., Ill., Ky., Md., Ga., Mo. $45.00
Alabama 45.00

Second Quality

Pa., Ill., Ky., Md., Mo., Ga., Ala..... 40.00

Ohio

First quality $40.00-45.00
Intermediary 37.00
Second quality 28.00

Malleable Bung Brick

All bases 50.00

Silica Brick

Pennsylvania $45.00
Joliet, E. Chicago 54.00
Birmingham, Ala. 52.00

Magnesite

Imported dead-burned grains, net ton f.o.b. Chester, Pa., and Baltimore bases (bags).... $45.00
Domestic dead-burned grains, net ton f.o.b. Chester, Pa., and Baltimore bases (bags).. 40.00
Domestic dead-burned gr. net ton f.o.b. Chewelah, Wash. (bulk).. 22.00

Basic Brick

Net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick $45.00
Chemically bonded chrome brick 42.50
Magnesite brick 65.00
Chemically bonded magnesite brick 55.00

Fluorspar, 85-5

Washed gravel, duty paid, tide, net ton $18.75-19.00
Washed gravel, f.o.b. Ill., Ky., net ton, carloads $13.00-14.00

Ferroalloys

Dollars, except Ferrochrome

Ferromanganese, 78-82% tidewater, duty paid 85.00
Do., Balti. base 85.00
Do., del. Pittsburgh 90.13
Spiegeleisen, 19-20% dom. Palmerton, Pa., spot† 26.00
Do., New Orleans 26.00
Ferrosilicon, 50% freight all., cl. 77.50
Do., less carload .. 85.00
Do., 75 per cent .. 126-130.00
Spot, $5 a ton higher.
Silicomang., 2½ carb. 90.00
2% carbon, 95.00; 1%, 105.00
Ferrochrome, 66-70 chromium, 4-6 carbon, cts. lb. con. del. 10.00
Ferrotungsten, stand., lb. cont. del. 1.35- 1.45
Ferrovanadium, 35 to 40% lb., cont., on analysis 2.70- 2.90
Ferrotitanium, c. l., prod. plant, frt. allow., net ton 137.50
Spot, 1 ton, frt. allow., lb. 7.00
do., under 1 ton..... 7.50
Ferrophosphorus, per ton, c. l., 17-19% Rockdale, Tenn., basis, 18%, $2 unitage 50.00
Ferrophosphorus, electrolytic, per ton c. l., 23-26% f.o.b. Anniston, Ala., 24% $2.75 unitage 65.00
Ferromolybdenum, stand. 55-65%, lb. 0.95
Molybdate, lb. cont. 0.80
†Carloads. Quan. diff. apply

Nonferrous Prices

METAL PRICES OF THE WEEK

Spot unless otherwise specified. Cents per pound

	Copper: Electro, del. Conn.	Copper: Lake, del. Midwest	Copper: Casting, refinery	Straits Tin: New York Spot	Straits Tin: New York Futures	Lead N. Y.	Lead East St. L.	Zinc St. L.	Aluminum 99%	Antimony Chinese Spot, N. Y.	Nickel Cathodes
May 4	9.00	9.12½	7.75	50.55	49.45	3.75	3.60	4.10	*19.00	14.25	35.00
May 6	9.00	9.12½	7.75	50.55	49.60	3.75	3.60	4.20	*19.00	14.25	35.00
May 7	9.00	9.12½	7.75	50.40	49.40	3.75	3.60	4.20	*19.00	14.25	35.00
May 8	9.00	9.12½	7.75	50.35	49.30	3.75	3.60	4.20	*19.00	14.25	35.00
May 9	9.00	9.12½	7.75	50.50	49.50	3.75	3.60	4.20	*19.00	14.25	35.00
May 10	9.00	9.12½	7.75	50.65	49.60	3.75	3.60	4.20	*19.00	14.25	35.00

*Nominal range 19.00 to 21.00c.

MILL PRODUCTS

F.o.b. mill base, cents per lb. except as specified. Copper, brass products based on 9.00c Conn. copper.

Sheets

Yellow brass (high) 14.25
Copper, hot rolled.... 16.00
Lead, cut, to jobbers 7.50
Zinc, 100-lb. base..... 9.50

Tubes and Pipes

High yellow brass.... 16.00
Seamless copper 16.25

Rods

High yellow brass.... 12.75
Copper, hot rolled 13.25

Anodes

Copper, untrimmed.. 13.75

Wire

Yellow brass (high) 14.75

OLD METALS

Deal. buying prices, cents lb.

No. 1 Composition Red Brass

New York 4.50- 4.75
Cleveland 5.25- 5.50
Chicago 4.62½-4.87½
*St. Louis 5.00- 5.25

Heavy Copper and Wire

New York, No. 1.... 5.87½-6.12½
Chicago, No. 1 ..... 5.75- 6.00
Cleveland 5.75- 6.00
*St. Louis, No. 1 .... 6.25- 6.50

Composition Brass Borings

New York 4.00- 4.25

Light Copper

New York 4.75- 5.00
Chicago 4.37½-4.62½
*Cleveland 4.75- 5.25
*St. Louis 5.00- 5.25

Light Brass

Chicago 2.25- 2.50
*Cleveland 2.75- 3.00

Lead

*New York 2.75- 3.00
*Cleveland 2.75- 3.00
Chicago 2.75- 3.00
*St. Louis 3.00- 3.10

Zinc

New York 2.00- 2.25
Cleveland 2.00- 2.25
*St. Louis 2.50- 2.65

Aluminum

Borings, Cleveland.. 8.00- 8.25
*Mixed, cast, Clev... 12.25-12.75
Mixed, cast, St. L... 12.75-13.00
*Clips, soft, Clev.... 14.00-14.50

SECONDARY METALS

Brass ingot, 85-5-5-5 8.00
*Stand No. 12 Alum. 16.00-17.00

Iron and Steel Scrap Prices

Corrected to Friday night Gross tons delivered to consumers, except where otherwise stated

HEAVY MELTING STEEL

Birmingham	8.50- 9.00
Boston, dock, expt.	8.50
Boston, domestic	7.00- 7.25
Buffalo, No. 1	10.00-10.50
Buffalo, No. 2	8.25- 8.50
Chicago, No. 1	10.00-10.50
Cleveland, No. 1	9.00- 9.50
Cleveland, No. 2	8.50- 9.00
Detroit, No. 1	7.50- 8.00
Detroit, No. 2	6.50- 7.00
Eastern Pa., No. 1	10.50
Eastern Pa., No. 2	9.00- 9.50
Federal, Ill.	7.75- 8.25
Granite City, R. R.	8.25- 8.75
Granite City, No. 2	7.00- 7.50
N. Y., deal, No. 2	7.00
N. Y., deal. barge	8.50
Pittsburgh, No. 1	11.75-12.25
Pittsburgh, No. 2	10.50-11.00
St. Louis	7.25- 7.75
Valleys, No. 1	11.00

COMPRESSED SHEETS

Buffalo, dealers	8.25- 8.50
Chicago. factory	8.50- 9.00
Chicago, dealer	7.50- 8.00
Cleveland	8.00- 8.50
Detroit	7.75- 8.25
E. Pa., new mat.	9.50
Pittsburgh	11.50-12.00
St. Louis	6.25- 6.75
Valleys	10.00

BUNDLED SHEETS

Buffalo	6.50- 7.00
Cincinnati, del.	6.00- 6.50
Cleveland	6.00- 6.50
Pittsburgh	10.50-11.00
St. Louis	4.50- 5.00

SHEET CLIPPINGS, LOOSE

Chicago	5.50- 6.00
Cincinnati	5.50- 6.00
Detroit	5.00- 5.50
St. Louis	4.25- 4.75

STEEL RAILS, SHORT

Birmingham	11.50-12.00
Buffalo	11.50-12.00
Chicago (3 ft.)	12.00-12.50
Chicago (2 ft.)	12.50-13.00
Cincinnati, del.	11.00-11.50
Detroit	9.50-10.00
Pitts., open-hearth, 3 ft. and less	14.50-15.00
St. Louis, 2 ft.& less	12.00-12.50

STEEL RAILS, SCRAP

Boston	7.00- 7.25
Chicago	10.00-10.50
Pittsburgh	12.00-12.50
St. Louis	9.00- 9.50

STOVE PLATE

Birmingham	5.75- 6.25
Boston, dealers	3.75- 4.00
Buffalo	9.00- 9.50
Chicago, net	6.00- 6.50
Cincinnati, dealers	5.50- 6.00
Detroit, net	5.75- 6.25
Eastern Pa.	8.00
N. Y., deal. fdry	6.00
St. Louis	5.50- 6.00

COUPLERS, SPRINGS

Buffalo	12.75-13.25
Chicago, springs	11.00-11.50
Eastern Pa.	13.50
Pittsburgh	14.50-15.00
St. Louis	9.25- 9.50

ANGLE BARS—STEEL

Chicago	11.00-11.50
St. Louis	9.50-10.00

RAILROAD SPECIALTIES

Chicago	11.00-11.50

LOW PHOSPHORUS

Buffalo, billets and bloom crops	12.00-12.50
Cleveland, billet, bloom crops	14.00-14.50
Eastern Pa., crops	13.00-14.00
Pittsburgh, billet, bloom crops	15.50-16.00
Pittsburgh, sheet bar crops	14.00-14.50
Pittsburgh, plate	13.25-13.75

FROGS, SWITCHES

Chicago	9.75-10.00
St. Louis, cut	9.00- 9.50

SHOVELING STEEL

Chicago	10.00-10.50
Federal, Ill.	7.50- 8.00
Granite City, Ill	7.75- 8.25

RAILROAD WROUGHT

Birmingham	7.00- 7.50
Boston, dealers	6.00- 6.50
Buffalo, No. 1	8.25- 8.50
Buffalo, No. 2	10.00-10.50
Chicago, No. 1, net	8.50- 9.00
Chicago, No. 2	10.00-10.50
Cincinnati, No. 2	7.50- 8.00
Eastern Pa.	10.00-10.50
N. Y., No. 1, deal	7.25- 7.75
St. Louis, No. 1	6.50- 7.00
St. Louis, No. 2	7.50- 8.00

SPECIFICATION PIPE

Boston	3.00- 3.25
Eastern Pa.	9.00- 9.50
New York, dealers	3.50- 4.00

BUSHELING

Buffalo, No. 1	8.25- 8.50
Chicago, No. 1	8.50- 9.00
Cinci., No. 1, deal	6.00- 6.50
Cincinnati, No. 2	2.75- 3.25
Cleveland, No. 2	6.00- 6.50
Detroit, No. 1, new	6.50- 7.00
Valleys, new, No. 1	10.00

MACHINE TURNINGS

Birmingham	3.50- 4.00
Boston, dealers	1.50- 1.75
Buffalo	4.50- 5.00
Chicago	5.00- 5.50
Cincinnati, dealers	3.50- 4.00
Cleveland	5.00- 5.50
Detroit	3.50- 4.00
Eastern Pa.	5.50- 6.00
New York, dealers	2.00- 2.25
Pittsburgh	8.00- 8.50
St. Louis	2.25- 2.75
Valleys	7.75- 8.00

BORINGS AND TURNINGS

For Blast Furnace Use

Boston, dealers	3.25- 3.50
Buffalo	5.75- 6.25
Cincinnati, dealers	4.50- 5.00
Cleveland	6.00- 6.50
Detroit	4.50- 5.00
Eastern Pa.	5.00
New York, dealers	1.50- 1.75
Pittsburgh	6.00- 6.50

CAST IRON BORINGS

Birmingham, plain	3.50- 4.00
Boston, chemical	5.50- 6.50
Boston, dealers	3.25- 3.50
Buffalo	5.75- 6.25
Chicago	5.00- 5.50
Cincinnati, dealers	3.50- 4.00
Cleveland	6.50- 7.00
Detroit	4.50- 5.00
E. Pa., chemical	11.00-12.00
New York, dealers	1.50- 1.75
St. Louis	2.00- 2.50

PIPE AND FLUES

Cincinnati, dealers	5.00- 5.50

RAILROAD GRATE BARS

Buffalo	7.00- 7.50
Chicago, net	6.00- 6.50
Cincinnati	4.00- 4.50
Eastern Pa.	8.00
New York, dealers	4.00- 4.50
St. Louis	4.50- 5.00

FORGE FLASHINGS

Boston, dealers	4.50- 4.75
Buffalo	8.50- 9.00
Cleveland	8.00- 8.50
Detroit	6.50- 7.00
Pittsburgh	10.50-11.00

FORGE SCRAP

Boston, dealers	4.50- 4.75
Chicago, heavy	10.50-11.00
Eastern Pa.	9.50-10.00

ARCH BARS, TRANSOMS

St. Louis	10.00-10.50

AXLE TURNINGS

Boston, dealers	3.00- 3.50
Buffalo	7.50- 8.00
Chicago, elec. fur	9.50-10.00
Cleveland	7.00- 7.50
Eastern Pa.	9.00
St. Louis	7.00- 7.50

STEEL CAR AXLES

Birmingham	12.00-12.50
Boston, ship. point.	10.00-10.50
Buffalo	12.00-12.50
Chicago, net	13.50-14.00
Eastern Pa.	16.00
St. Louis	12.00-12.50

SHAFTING

Boston, ship. point.	11.75-12.00
Eastern Pa.	16.50
New York dealers	12.00-12.50
St. Louis	11.00-11.50

CAR WHEELS

Birmingham	8.00- 9.00
Boston, iron deal	5.25- 5.50
Buffalo, iron	11.00-11.50
Buffalo, steel	12.00-12.50
Chicago, iron	10.50-11.00
Chicago. rolled steel	10.50-11.00
Cincinnati, iron	8.00- 8.50
Eastern Pa., iron	10.50-11.00
Eastern Pa., steel	13.50
Pittsburgh, iron	12.50-13.00
Pittsburgh, steel	14.50-15.00
St. Louis, iron	7.50- 8.00
St. Louis, steel	9.50-10.00

NO. 1 CAST SCRAP

Birmingham	8.50- 9.00
Boston, No. 1 mach.	8.50- 9.00
Boston, No. 2	7.50- 8.00
Boston, tex. con.	8.50- 9.00
Buffalo, cupola	10.50-11.00
Buffalo, mach.	10.25-10.75
Chicago, agri. net	8.00- 8.50
Chicago, auto	9.00- 9.50
Chicago, mach. net	9.00- 9.50
Chicago. railr'd net	8.00- 8.50
Cinci., mach. cup	8.50 9.00
Cleveland, cupola	11.50-12.00
Detroit, net	9.50-10.00
Eastern Pa., cupola	11.00-12.00
E. Pa.,mixed yard	8.50- 9.50
Pittsburgh, cupola	12.75-13.25
San Francisco, del.	13.50-14.00
Seattle	7.00- 8.50
St. Louis, No. 1	8.00- 8.50
St. L., No. 1 mach.	9.00- 9.50

HEAVY CAST

Boston, del.	5.00- 5.25
Buffalo, break.	8.00- 8.50
Cleveland, break.	7.50- 8.00
Detroit, auto, net	9.50-10.00
Detroit, break.	7.00- 7.50
Detroit, auto net	9.50-10.00
Eastern Pa.	10.50
N. Y., break. deal	5.50- 5.75
Pittsburgh	11.75-12.25

MALLEABLE

Birmingham, R. R.	9.00-10.00
Boston, consum.	12.00-12.50
Buffalo	12.00-12.50
Chicago, R. R.	12.50-13.00
Cincinnati, agri. del.	8.25- 8.75
Cleveland, rail	12.00-12.50
Detroit, auto	10.00-10.50
St. Louis, R. R.	9.50-10.00
Eastern Pa., R. R.	11.00-11.50

RAILS FOR ROLLING

5 feet and over

Birmingham	10.00-10.50
Boston, dealers	8.00- 8.50
Buffalo	10.00-11.00
Chicago	10.75-11.25
Eastern Pa.	12.50-13.00
New York, dealer	7.50- 8.00
St. Louis	10.00-10.50

LOCOMOTIVE TIRES

Chicago (cut)	11.00-11.50
St. Louis, No. 1	9.00- 9.50

LOW PHOS. PUNCHINGS

Buffalo	12.00-12.50
Chicago	11.50-12.00
Eastern Pa.	13.00-14.00
Pittsburgh	13.00-13.50

Iron Ore

Lake Superior Ore

Gross ton, 51½% Lower Lake Ports

Old range bessemer	$4.80
Mesabi nonbess.	4.50
High phosphorus	4.40
Mesabi bessemer	4.65
Old range nonbess.	4.65

Eastern Local Ores

Cents, unit, del. E. Pa.

Foundry and basic 56-63% con. (nom.)	8.00- 9.00
Cop.-free low phos. 58-60% (nom.)	10.00-10.50

Foreign Ore

Cents per unit, f.a.s. Atlantic ports (nominal)

Foreign manganiferous ore, 45.55% iron, 6-10% man.	10.00
No. Afr. low phos.	10.00
Swedish basic, 65%	9.00
Swedish low phos.	10.00
Spanish No. Africa basic, 50 to 60%	9.00
Tungsten, spot, sh. ton unit, duty pd.	$17.75-18.25
N. F. fdy., 55%	7.00
Chrome ore, 48% gross ton, c.i.f.	$18.00-19.50

Manganese Ore

(Nominal)

Prices not including duty, cents per unit cargo lots.

Caucasian, 52-55%	26.00
So. African, 52%	26.00
So. Afr., 49-51%	24.00
Indian, 58-60%	nominal
Indian, 48-50%	nominal

Warehouse Iron and Steel Prices

Cents per pound for delivery within metropolitan districts of cities specified

STEEL BARS	
Baltimore*	2.90c
Boston††	2.95c
Buffalo	3.00c
Chattanooga	3.31c
Chicago	2.95c
Cincinnati	3.17c
Cleveland	2.95c
Detroit	3.03½c
Houston	3.00c
Los Angeles	3.60c
Milwaukee	3.06c
New Orleans	3.30c
New York‡(d)	3.22c
Pittsburgh (h)	2.90c
Philadelphia*	2.93c
San Francisco	3.60c
Seattle	3.60c
St. Louis	3.19c
St. Paul	3.00c
Tulsa	3.25c
IRON BARS	
Portland	3.40c
Chattanooga	3.31c
Baltimore*	3.00c
Chicago	2.75c
Cincinnati	3.17c
New York‡(d)	3.32c
Philadelphia*	2.93c
St. Louis	3.19c
Tulsa	3.25c
REINFORCING BARS	
Buffalo	2.60c
Chattanooga	3.31c
Chicago	2.10c-2.60c
Cleveland (c)	2.10c
Cincinnati	3.25c
Houston	3.25c
Los Ang., cl.	2.45c
New Orleans	3.50c
Pitts., plain (h)	3.05c
Pitts., twisted squares (h)	3.175c
San Francisco	2.45c
Seattle	2.45c
St. Louis	3.24c
Tulsa	3.25c
Young.	2.30c-2.60c
SHAPES	
Baltimore*	2.95c
Boston††	3.17c
Buffalo	3.25c
Chattanooga	3.56c
Chicago	3.20c
Cincinnati	3.42c
Cleveland	3.31c
Detroit	3.40c
Houston	3.00c
Los Angeles	3.60c
Milwaukee	3.31c
New Orleans	3.55c
New York(d)	3.37c
Philadelphia*	2.98c
Pittsburgh(h)	3.15c
Portland	3.55c
San Francisco	3.55c
Seattle	3.55c
St. Louis	3.44c
St. Paul	3.25c
Tulsa	3.50c
PLATES	
Baltimore*	2.95c
Boston††	3.18c
Buffalo	3.37c
Chattanooga	3.56c
Chicago	3.20c
Cincinnati	3.42c
Cleveland, ¼-in. and over	3.31c
Detroit	3.40c
Detroit, ⅜-in.	3.65 c
Houston	3.00c
Los Angeles	3.60c
Milwaukee	3.31c
New Orleans	3.55c
New York(d)	3.40c
Philadelphia*	2.98c
Phila. floor	4.98c
Pittsburgh(h)	3.15c
Portland	3.55c
San Francisco	3.55c
Seattle	3.55c
St. Louis	3.44c
St. Paul	3.25c
Tulsa	3.50c
NO. 10 BLUE	
Baltimore*	3.05c
Boston††	3.25c
Buffalo	3.62c
Chattanooga	3.36c
Chicago	3.05c
Cincinnati	3.22c
Cleveland	3.11c
Det., 8-10 ga.	3.13½c
Houston	3.35c
Los Angeles	3.70c
Milwaukee	3.16c
New Orleans	3.55c
New York	3.27c
Portland	3.75c
Philadelphia*	3.08c
Pittsburgh(h)	2.95c
San Francisco	3.75c
Seattle	3.75c
St. Louis	3.29c
St. Paul	3.45c
Tulsa	3.70c
NO. 24 BLACK	
Baltimore*†	3.51c
Boston (g)	3.90c
Buffalo	3.25c
Chattanooga	4.21c
Chicago	3.85c
Cincinnati	4.07c
Cleveland	3.91c
Detroit	3.98½c
Los Angeles	4.35c
Milwaukee	3.96c
New York	3.85c
Philadelphia*†	3.58c
Pitts.** (h)	3.55c
Portland	4.40c
San Francisco	4.40c
Seattle	4.40c
St. Louis	4.09c
St. Paul	3.695c
Tulsa	4.75c
NO. 24 GALV. SHEETS	
Baltimore*†	4.21c
Buffalo	4.00c
Boston (g)	4.60c
Chattanooga	4.86c
Chicago (h)	4.55c
Cincinnati	4.72c
Cleveland	4.61c
Detroit	4.70c
Houston	4.40c
Los Angeles	4.95c
Milwaukee	4.66c
New Orleans	4.50c
New York	4.50c
Philadelphia*†	4.28c
Pitts** (h)	4.15-4.45c
Portland	5.00c
San Francisco	5.00c
Seattle	5.00c
St. Louis	4.79c
St. Paul	4.19c
Tulsa	5.10c
BANDS	
Baltimore*	3.15c
Boston††	3.25c
Buffalo	3.42c
Chattanooga	3.61c
Chicago	3.30c
Cincinnati	3.47c
Cleveland	3.36c
Detroit, ⅜-in. and lighter	3.38½c
Houston	3.25c
Los Angeles	4.10c
Milwaukee	3.41c
New Orleans	3.95c
New York(d)	3.52c
Philadelphia	3.18c
Pittsburgh(h)	3.20c
Portland	4.25c
San Francisco	4.25c
Seattle	4.25c
St. Louis	3.54c
St. Paul	3.20c
Tulsa	3.45c
HOOPS	
Baltimore	2.30c
Boston	4.25c
Buffalo	3.42c
Chicago	3.30c
Cincinnati	3.47c
Det., No. 14 and lighter	3.38½c
Los Angeles	5.85c
Milwaukee	3.41c
New York	3.52c
Philadelphia	3.43c
Pittsburgh(h)	3.70c
Portland	5.60c
San Francisco	6.15c
Seattle	5.60c
St. Louis	3.54c
St. Paul	3.75c
COLD FIN. STEEL	
Baltimore (c)	3.56c
Boston	3.60c-3.85c
Buffalo (h)	3.40c
Chattanooga*	3.98c
Chicago (h)	3.35c
Cincinnati	3.57c
Cleveland (h)	3.35c
Detroit	3.48½c
Los. Ang.(f) (d)	5.70c
Milwaukee	3.46c
New Orleans	4.15c
New York	3.77c-4.27c
Philadelphia	3.61c
Pittsburgh	3.20c
Portland (f)	5.85c
San Fran.(f) (d)	5.80c
Seattle (f) (d)	5.85c
St. Louis	3.59c
St. Paul	3.05c
Tulsa	4.50c
COLD ROLLED STRIP	
Boston, 0.100-in., 500 lb. lots	5.35c
Buffalo	3.39c
Chicago	3.27c
Cincinnati (b)	3.44c
Cleveland (b)	3.20c
Detroit	3.33c
New York	4.70c
St. Louis	3.36c

TOOL STEELS

(Applying on or east of Mississippi river; west of Mississippi 1c up)

	Base
High speed	57c
High carbon, high chrome	37c
Oil hardening	22c
Special tool	20c
Extra tool	17c
Regular tool	14c

Uniform extras apply

BOLTS AND NUTS

(100 pounds or over)

	Discount
Chicago (a)	70
Cleveland	70
Detroit	70
Milwaukee	70
Pittsburgh	70

(a) Under 100 pounds, 65 off.

(b) Plus straightening, cutting and quantity differentials; (c) Plus mill, size and quantity extras; (d) Minus quant. diff.; (e) New mill classif.; (f) Rounds only; (g) 50 bundles or over; (h) Outside delivery, 10c less.

‡Domestic bars; *Plus quan. extras; **Under 25 bundles; *†50 or more bundles; †New extras apply; ††Base 40,000 lbs., extras on less.

Prices on heavier lines are subject to new quantity differentials; 399 lbs. and less, up 50 cts.; 400 to 9999 lbs., base; 10,000 to 19,999 lbs., 15 cts. under; 20,000 to 39,999 lbs., 25 cts. under; 40,000 lbs. and over, 35 cts. under base.

Current Iron and Steel Prices of Europe

Dollars at Rates of Exchange, May 9

Export Prices f. o. b. Ship at Port of Dispatch—By Cable (or Radio)

	British gross tons U. K. ports		Continental Channel or North Sea ports, metric tons	
PIG IRON	£ s d		Quoted in dollars at current value	**Quoted in gold pounds sterling £ s d
Foundry, 2.50-3.00 Silicon	$15.16	3 2 6	$13.83	1 14 0
Basic bessemer	15.16	3 2 6*	13.01	1 12 0
Hematite, Phos. .03-.05	15.68	3 3 0	.....	.....
SEMIFINISHED STEEL				
Billets	$26.68	5 10 0	$19.12	2 7 0
Wire rods, No. 5 gage	41.23	8 10 0	36.61	4 10 0
FINISHED STEEL				
Standard rails	$37.59	7 15 0	$44.74	5 10 0
Merchant bars	1.63c	7 10 0	1.15c to 1.20c	3 2 6 to 3 5 0
Structural shapes	1.60c	7 7 6	1.14c	3 1 6
Plates, †¼ in. or 5 mm.	1.74c	8 0 0	1.52c	4 2 6
Sheets, black, 24 gage or 0.5 mm.	2.01c	9 5 0	2.14c	5 16 0††
Sheets, gal., 24 gage, corr.	2.44c	11 5 0	3.22c	8 15 0
Bands and strips	1.84c	8 10 0	1.47c	4 0 0
Plain wire, base	2.01c	9 5 0	1.97c	5 7 6
Galvanized wire, base	2.33c	10 15 0	2.30c to 2.34c	6 5 6 to 6 7 6
Wire nails, base	2.60c	12 0 0	2.12c	5 15 0
Tin plate, box 108 lbs.	$ 4.37	0 18 2	.....	.....

British ferromanganese $85 delivered Atlantic seaboard, duty-paid. German ferromanganese £9 0s 0d $(43.74) f.o.b.

Domestic Prices at Works or Furnace—Last Reported

			French Francs		Belgian Francs		Reich Marks
	£ s d						
Fdy. pig iron, Si. 2.5	$16.37	3 7 6(a)	$17.13	260	$12.51	370	$25.34	63
Basic bessemer pig iron	16.37	3 7 6(a)*	12.19	185	11.15	330	27.95 (b)	69.50
Furnace coke	4.00	0 16 6	7.91	120	3.72	110	7.64	19
Billets	26.68	5 10 0	28.34	430	18.25	540	38.81	96.50
Standard rails	1.79c	8 5 0	2.08c	694	1.65c	1,100	2.40c	132
Merchant bars	1.87c	8 12 0	1.68c	560	.90c	600	2.00c	110
Structural shapes	1.90c	8 15 0	1.65c	550	.90c	600	1.96c	107.50
Plates, †¼-in. or 5 mm.	1.97c	9 1 3	2.10c	700	1.13c	750	2.31c	127
Sheets, black	2.28c	10 10 0§	2.55c	850‡	1.24c	825‡	2.62c	144‡
Sheets, galv., corr., 24 ga. or 0.5 mm.	2.82c	13 0 0	4.05c	1,350	2.25c	1,500	6.73c	370
Plain wire	2.01c	9 5 0	3.39c	1,130	1.65c	1,100	3.15c	173
Bands and strips	2.03c	9 7 0	1.95c	650	1.26c	840	2.31c	127

*Basic. †British ship-plates. Continental, bridge plates. §24 ga. ‡1 to 3 mm. basic price British quotations are for basic open-hearth steel. Continental usually for basic-bessemer steel a del. Middlesbrough. b hematite. ††Close annealed

**Gold pound sterling carries a premium of 67 per cent over paper sterling.

Expect Prices To Be Extended

New York—The preponderance of trade opinion here is that there will be no general change when prices are filed May 21 for third quarter. Producers, it is believed, will still be uncertain as to what NRA legislation will be enacted, and under the circumstances will not be inclined to revise quotations.

Many believe that while advances are warranted by increasing production costs, the business outlook for the early summer is not sufficiently promising. Some think the effort should be made, but they appear in the minority.

As to what prices actually will develop after the future of NRA becomes thoroughly clarified, leaders refuse comment. Donald R. Richberg's latest quoted statement that only industries indisputedly in or directly affecting interstate commerce would be coded under the administration's proposed program has caused some to believe the steel code will be dropped.

Should this prove to be the case, softer prices undoubtedly would develop for a time, it is believed. However, there are many overhanging uncertainties, and as to what extent producers may be able to discount future NRA legislation, when time comes to file prices, remains to be seen.

Bars

Bar Prices, Page 58

Chicago—Steel bar sales and specifications are declining slowly. Some recession is noted in automotive demand, part attributed to labor troubles, while production of some farm machinery has been affected adversely by weather influences. Tractor manufacturers, however, still are operating close to capacity under the stimulus of brisk demand. Bar consumption by miscellaneous users is fairly steady, but stocks are being held low and purchases are for early needs.

Cleveland—While good specifications are being received from automobile and tractor manufacturers and builders of road machinery, volume shows a further decline and steel bar production here during the week dropped below 50 per cent. Chevrolet, still hampered by strikes, and moving equipment from its Toledo, O., transmission plant to Muncie, Ind., issued production releases to forge and parts shops, with instructions to hold products ready to ship when notified. Chrysler was reported having some labor difficulties, and a few sympathy strikes also were noted in plants manufacturing for Chevrolet account. A moderate price advance for third quarter, generally $1 a ton to be filed May 22, for bars, plates and shapes is being discussed, though no decision has been reached.

Philadelphia — Commercial steel bar tonnage is spotty, although volume, according to some leading sellers, appears a shade better. Agricultural implement manufacturers have recently issued some fair releases. Commercial steel bars are 2.11c, Philadelphia.

Boston—Commercial steel, alloy and forging bars are slightly less active. Consumers are generally operating with low stocks, ordering more frequently, but in small lots. Forging shop schedules are lower in several instances.

Pittsburgh—Alloy and carbon bar orders have been adversely affected by automotive shipping suspensions. Many automobile manufacturers are still specifying against their bar contracts, but it is evident from rush shipping directions that they are holding down inventories. Bar requirements of the general manufacturing trade and miscellaneous groups, as well as farm implement manufacturers, of which latter group tractor makers are important, are still well sustained. Carbon bars remain 1.80c, base Pittsburgh, and alloy bars, 2.45c, base.

Youngstown, O.—Steel bar mill activities have tapered, due to auto partsmakers hold-up instructions until the Toledo strike situation clarifies. This appears especially true of alloy steel bars. But agricultural implement makers, large boltmakers and a wide variety of common bar users continue to take satisfactory tonnages. Makers of bars are exploring the possibilities of a $2 advance for third quarter to compensate for railroad freight surcharges.

New York—Demand for steel bars is slow and improvement reported from other districts is not reflected here.

Plates

Plate Prices, Page 58

Pittsburgh — Treadwell Construction Co., Midland, Pa., is low on a $24,720 bid, closely followed by McClintic-Marshall Corp., Bethlehem, Pa., at $24,780 for sixty 52-foot lengths of shore pipe which will require about 250 tons of ½-inch plates. This pipe is destined for consignment to Vicksburg, Miss., engineers, and is a portion of an additional order for 1000 tons of plates which will be required for 71 steel pontoons and on which St. Louis Shipbuilding & Steel Co., St. Louis, is low at $120,000. Pittsburgh army engineers close on bids May 27 for two large valves for the Grafton, W. Va., reservoir dam on the Tygart river, which it is reported will take about 690 tons of plates. Preliminarily, contract award has been signified for Dravo Contracting Co., Pittsburgh, covering six 110 x 26-foot steel barges for the Tennessee valley authority, Knoxville, Tenn., on a bid of $50,840. Bare shops here have received an inquiry for four 40 x 10 x 5-foot steel barges which Washington, D. C., engineers will close on May 21. Plates at 1.80c, Pittsburgh, are steady with likelihood favoring no change in this price for third quarter.

Cleveland — Several construction projects in this district requiring substantial plate tonnages, but dependent on government financing, still are in abeyance. This city may close this week with the general contractor for disposal plant work, requiring several hundred tons of plates and shapes, which were awarded tentatively several months ago. Some boiler manufacturers are fairly busy and continue to place carload orders, but tank requirements are light.

Chicago—Plate demand is retarded by a lull in heavy construction, though fabricators are taking slightly larger lots for work booked a short time ago. Poor operation of railroad equipment builders and restricted activity at railroad repair shops is limiting plate production. Plate demand for line pipe manufacture also is light.

Boston—Demand for plates continues light, most business being small lots for miscellaneous needs. An exception includes 785 tons for 48-inch steel pipe for the metropolitan district commission, on which bids are in.

New York—Plate demand is the dullest in several weeks with pronounced decline during the past several days. Expectation of drastic changes in NRA is held chiefly responsible.

San Francisco — Plate buying is restricted to unimportant tonnages for miscellaneous requirements. Bids will be opened May 15 on 150 tons for a tank and tower for South Pasadena, Calif.

Philadelphia—Plate tonnage continues restricted to small lots, with perforated metal manufacturers issuing modest releases and with some tonnage going into ship work. Pusey & Jones, Wilmington, Del., are re-

ported to have placed about 300 tons of plates for the lightship NANTUCKET, with the greater portion, at least, going to a nearby mill. Tank work is negligible. Plates are 1.90c, Coatesville, Pa., or 1.99c, Philadelphia.

Decision of workers at the plant of the New York Ship Building Co. at Camden, N. J., to strike May is expected to result in suspension of steel shipments to that plant. The strike will affect 600 workers at the Camden plant. The Reading is releasing small orders for car repairs, following suspension of shipments in April.

Seattle — No awards of consequence were made this week but projects requiring plates are beginning to develop. In connection with the Ballard trunk sewer project, Seattle, engineers plan an inverted 36-inch siphon, 2490 feet long, tonnage unstated. This job will be up for figures soon. Bernard Curtiss Co., Minneapolis, is low at $938,786 for three schedules of the Ogden river, Utah, conduit, tonnage unstated.

Contracts Placed

1060 tons, 71 dredge pontoons, United States engineers, Vicksburg, Miss., and Memphis, Tenn., to St. Louis Shipbuilding & Steel Co., St. Louis.

250 tons, sixty 52-foot sections, 30 inches inside diameter, mainly of ½-inch plates, for Vicksburg, Miss., engineers, to Treadwell Construction Co., Midland, Pa., at $24,720, delivered Vicksburg; McClintic-Marshall Corp., Bethlehem, Pa., second low at $24,780.

185 tons, repairs, gas-holder, United Light & Power Co., Chattanooga, Tenn., to Stacey Bros. Gas Construction Co., Cincinnati.

100 tons, standpipe, Hinsdale, N. H., to Chicago Bridge & Iron Works, Chicago.

Contracts Pending

690 tons, two 48-inch needle valves for Tygart river reservoir dam, Grafton, W. Va.; bids to Pittsburgh army engineers, May 27.

150 tons, 150,000-gallon tank and tower, South Pasadena, Calif.; bids May 15.

Unstated, conduit, Odgen river, Utah, reclamation project; Bernard Curtiss Co., Minneapolis, low.

Sheets

Sheet Prices, Page 58

Pittsburgh—Autobody sheet users, who it was first feared would issue cancellations following recent strikes, have adopted the policy of permitting sheet producers to continue to roll on their orders, but are asking that shipments be suspended until further notice. Body builders state they will advise when producers are to cease rolling. Full-finished sheet operations last week were off 2 points to 56 per cent of capacity, and common black sheets lost 1 point to 63 per cent. Galvanized sheets, past the year's peak, are off several points to the 50 per cent. No definite decision has been reached on prices for third quarter.

Cleveland — Leading sheet producers last week were strongly inclined toward a slight advance in prices for third quarter, to be filed May 22. Some pointed out that emergency freight surcharges now apply on nearly six tons of raw material used in making one ton of sheets. Good specifications were received from a well diversified list of consumers, including automotive, stove, refrigerator, washing machine and sign manufacturers. Production schedules in household equipment are tapering slowly. Shipments to Chevrolet and Fisher Body units still were suspended, and sheet mill operations here remained at 50 per cent. Newton Steel Co., Monroe, Mich., expects to resume production late this week, following the settlement of its strike.

Chicago—Sheet demand is declining and shipments also are less active. The automotive industry is responsible for a portion of the quieter activity, with labor troubles a factor. Miscellaneous users are taking smaller lots though operations of this group have been fairly well maintained. Stocks are being held low with a disposition noted to await the outcome of the code extension and filing of third quarter prices before adding to inventories.

Boston—Sheet buying is slower with several industrial consumers less active. Buying is well distributed as to finishes, although galvanized still are inclined to lag.

New York—Sheet specifications are fairly well sustained, there having been little variation in more than a month. There appears to be just sufficient improvement in building demands to offset the slight decline in manufacturing requirements at this time. Prices are unchanged.

Philadelphia—Sheet business continues to decline slightly. Releases from autobody builders are lighter than recently and this is also true of specifications from stovemakers and oil burner manufacturers. Despite improved weather conditions, building shows little gain.

Buffalo—Buffalo sheet mills continue to operate at 75 per cent, and bookings for the remainder of the month indicate there will be little drop in operations prior to the Memorial day holiday, although unfilled tonnage is being reduced steadily.

Youngstown, O.—More steel sheet and strip finishing capacity was started this week by Republic Steel Corp., at Warren; Youngstown Sheet & Tube Co. at Brier Hill works, and Sharon Steel Hoop Co. at Sharon, Pa., than was active last week. This schedule may be continued for at least one more week and likely two, due to the volume of specifications in hand. Holdup instructions from automobile partsmakers as yet have not been received in any volume by valley mills. Although the due date for third quarter price filings under the code is only two weeks off, sheetmakers generally have not as yet seriously taken up their determination; but they may do so shortly.

Cincinnati—Sheet mills in this district have had some shipping suspensions on account of automotive consumers' strikes, but other demand has held fairly steady. Rolling schedules during the past week were close to 70 per cent.

St. Louis—Sheet makers and distributors report some slowing down in specifications and new business. Orders are mainly for small lots, but come from a diversity of users.

Birmingham, Ala.—No change in production is noted here, and shipments are steady.

Transportation

Track Material Prices, Page 59

Domestic freight car awards in April comprise 350 cars, not including 55 milk cars for the Erie railroad which fall more nearly into the passenger car classification. Of the total of 350 all were placed by the railroads with their own shops.

April bookings bring the total for the first four months to 1180, compared with 20,707 in the corresponding period of 1934, 58 in the corresponding period of 1933 and 359 in the first four months of 1932. Further comparisons follow:

	1935	1934	1933	1932
Jan.	24	152	3	159
Feb.	806	19,725	0	35
March	0	30	5	105
April	350	800	50	0
4 Mo.	1,180	20,707	58	359
May		717	8	60
June		1,835	500	0
July		19	306	25
Aug.		105	202	5
Sept.		7	23	1,298
Oct.		75	514	0
Nov.		254	533	2
Dec.		110	316	50
Total		23,829	2,460	1,739

The Erie has distributed 17,380 tons of rails, as follows: 9900 tons 131-pound and 500 tons second quality, to Carnegie Steel Co.; 3280 tons to Illinois Steel Co.; 2600 tons to Bethlehem Steel Corp. and 1100 tons to Inland Steel Co., all the latter being 112-pound. It also has distributed orders for approximately 3500 tons of accessories to various manufacturers. Last year it purchased 32,121 tons of rails. The

municipal railroad at San Francisco will close on 235 tons of rails shortly.

Goodyear-Zeppelin Corp., Akron, O., which recently completed a streamlined train for the New Haven has been asked to quote on another similar unit.

St. Louis & San Francisco will rebuild 750 box cars at its shops at Springfield, Mo.

Effective May 18 angle splice bars for rails over 60 pounds per yard will be quoted 2.10c, Gary, Ind., and South Chicago, for axle steel and 2.55c, same bases, for billet steel. These are initial quotations for these products at these points.

Car Orders Placed

St. Louis-San Francisco, rebuilding 750 wooden box cars, own shops, Springfield, Mo.

Locomotives Placed

Belt Railway of Chicago, two 660-horsepower diesel-electric locomotives, to American Locomotive Co., New York.

Cyprus Mines Corp., Isle of Cyprus, one 8-ton, 30-inch gage diesel locomotive, to Vulcan Iron Works, Wilkes-Barre, Pa.

Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y., one 30-ton standard gage gasoline engine, to Vulcan Iron Works, Wilkes-Barre, Pa.

Rail Orders Placed

South African government, 10,000 tons, to Dominion Steel & Coal Corp., Sydney, N. S.

Akron, Canton & Youngstown, 7394 tons of 90-pound rails, to Carnegie Steel Co., Pittsburgh.

Erie railroad, 17,380 tons allocated as follows: Carnegie Steel Co., Pittsburgh, 9900 tons of first-quality 131-pound rails and 500 tons of second-quality rails; Illinois Steel Co., Chicago, 3280 tons of 112-pound rails; Bethlehem Steel Co., Bethlehem, Pa., 2600 tons of 112-pound, and Inland Steel Co., Chicago, 1100 tons of 112-pound.

Car Orders Pending

Norfolk Southern, 500 40-ton box cars, contemplated.

Locomotives Pending

Tientsin-Tukow, Tientsin, China, 16 locomotives, bids asked; these are in addition to 20 on inquiry for the Chinese government, making total of 36 locomotives noted last week as pending for China.

Cold Finished

Cold Finished Prices, Page 59

Pittsburgh—Cold-drawn bar buyers generally are interested in the price stand producers will take on

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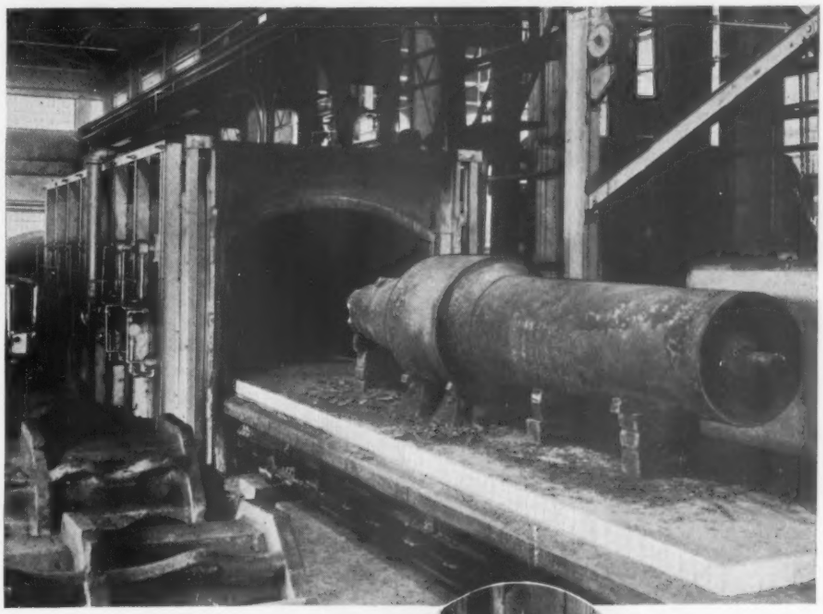

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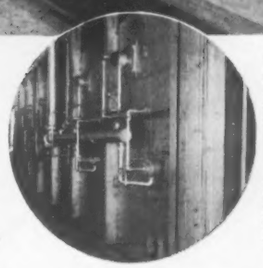

Gas-operated car-type annealing furnace, insulated with 9" Armstrong's EF Brick and 9" Nonpareil Insulating Brick.

~ ~

Another view of this efficiently insulated heat-treating furnace built by Swindell-Dressler for a Pittsburgh manufacturer.

ACCURATE temperature control is assured in this gas-operated car-type annealing furnace, built by Swindell-Dressler for a Pittsburgh manufacturer. Tests show a temperature variation of less than 10° in any part of the furnace, which operates from 1200° to 2000° F.

In maintaining such heat uniformity, adequate insulation plays an important part! Walls and arch are constructed of 9" Armstrong's EF Brick, backed up with 9" Nonpareil Insulating Brick, and coated with two coats of fire clay. The car bottom is insulated with 6" of calcined diatomaceous earth concrete.

And thorough insulation has afforded another important advantage, in addition to temperature precision! Valuable fuel savings have been achieved! Heating costs are 65% less than the heating cost of the furnace previously operated by this manufacturer.

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Armstrong's

THREE HIGH TEMPERATURE BRICK

Armstrong's* - EF - *Nonpareil

cold-finished carbon steel bars for third quarter. The present price is based on 1.95c, Pittsburgh, and apparently there is some well-founded opinion that this figure may be raised to recoup in all or in part the $3 a ton cut in the market of a month ago. The price policy of producers for the third quarter has not yet become official, but by May 22 some announcement will have been made. Instead of canceling many cold-drawn bar orders which are unshipped, some automobile partsmakers affected by strikes have permitted cold-drawn bar mills to produce against their orders, but with a holdup on shipments until further notice.

Pipe

Pipe Prices, Page 59

Pittsburgh—Sustained buying of oil country goods has improved operations of district pipe mills, now at 45 per cent. This rate is being exceeded by some smaller producers. Boiler tube buying has shown some life the past week and standard pipe requirements have been fairly steady. Discounts on all tubular products are without change. No revision is expected for third quarter.

Chicago—Backlogs of cast iron pipe producers are declining as shipments against old contracts are increasing, and new business recently has been insufficient to offset deliveries. Inquiries also are relatively small though a fair tonnage on which bids have been taken is pending.

Boston—Improvement in demand for cast pipe which developed late last month continues and several thousand tons have been bought. Merchant steel pipe activity is steady; wrought volume little gain.

New York—Cast pipe inquiry continues seasonally light, although Buffalo, N. Y., has bids on a large tonnage, the same inquiry which was withdrawn several weeks ago and revised. Most buying is for small lots.

New York—Resale pipe market here has lost all semblance of stability. Some interests assert the situation is completely out of hand, with prices decidedly unsettled.

Youngstown, O.—Current demand for wrought pipe continues to center around the smaller-sized commercial forms, and the comparatively light demand for larger oil and gas sizes appears satisfied for the most part by electric welded pipe makers.

Birmingham, Ala.—Small tonnage orders are fairly numerous and shipments of cast iron pressure pipe total a little better than during previous months. Numerous awards for PWA work in and out of this state still are looked for by pipemakers.

San Francisco—Awards of cast iron pipe the past week aggregated less than 500 tons. No award has yet been made on 5150 tons for Los Angeles or on over 500 tons for Oakland, Calif.

Seattle—Large cast pipe projects are lacking and buyers generally are asking alternates for less expensive materials.

Cast Pipe Placed

400 tons, Princeton, Wis., to James B. Clow & Sons, Chicago.
262 tons, 2 to 8-inch, class 150, Pauguitch, Utah., to unnamed interest.
160 tons, 8-inch, Yonkers, N. Y., to R. D. Wood & Co., Philadelphia.

Cast Pipe Pending

950 tons, 48-inch, Bayonne, N. J.; bids in.
145 tons, 4, 6 and 8-inch, Bainville, Mont.; bids in.
138 tons, 6 and 8-inch, Jacksonville, Oreg.; bids May 23.
Unstated tonnage, 3 miles of 8-inch, alternate for wrapped steel, Heppner, Oreg.; bids in.

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Shapes

Structural Shape Prices, Page 58

New York—Bids close June 6 on the tunnel approach and plaza for the midtown Manhattan-Weehawken, N. J., Hudson river tunnel. The plaza section will take approximately 2500 tons, including 173 tons of silicon material. Alternates on steel and cast iron segments will be taken on the tunnel lining, the estimate for steel being 890 tons. Bids close May 16 on the steel for the Harlem river span of the Triboro bridge, 7500 tons.

Pittsburgh—In addition to structural steel requirements included in the general contract for the Tygart river reservoir dam, contract for which is held by Frederick Snare Corp., New York, additional requirements are now being bid to the Pittsburgh army engineers direct for shipment to this job. For trash rack frames about 180 tons of shapes will be bid to the local engineers May 22, and fair-size tonnages are involved in six steel conduits for May 20 bid. Michigan Valve Co., Detroit, is low at $159,866 for 18 slide gates for this project, on which bids were opened at Pittsburgh May 8.

Cleveland—General Asphalt Paving Co., Canton, O., submitted the low bid May 9 for the Main street bridge, Columbus, O., requiring 790 tons of shapes and 600 tons of reinforcing bars, the largest project active in this district. National Superior Co., Toledo, O., is taking bids on 450 tons for a factory building. Numerous small tonnages are being figured, but actual awards for the week were light. Erie railroad has two grade crossing projects to take 2500 tons.

Chicago—Releases of plain structural material are heavier though new inquiries are smaller than the average during most of the preceding months of this year. For a water diversion project at Danville, 1350 tons of piling has been divided among five producers. Few large projects, with the exception of the St. Louis postoffice, are scheduled for bids soon, but a fairly large tonnage is in prospect for future months.

Boston — Structural fabricating shops have little tonnage. Outlook for construction work is uncertain and pending requirements are light. A new structural shop at the Boston navy yard is being advocated.

Philadelphia—The largest district construction job pending here in considerable time involves 1000 tons for a factory building for the Downingtown Paper Co., Downingtown, Pa. Little else in the immediate district is active. Shapes are unchanged at 2.01½c, delivered Philadelphia.

San Francisco—Demand for structural shapes was limited to relatively small tonnages which totaled less than 700 tons. To date this year 30,291 tons have been booked, compared with 37,077 tons for the corresponding period in 1934. A number of new inquiries are noted. Bids have been opened on 850 tons for the California Walnut Growers' as-

Shape Awards Compared

	Tons
Week ended May 11	7625
Week ended May 4	15,296
Week ended April 27	14,052
This week in 1934	17,150
Weekly average, 1934	16,284
Weekly average, 1935	15,088
Weekly average, April	15,412
Total to date, 1934	350,660
Total to date, 1935	286,669

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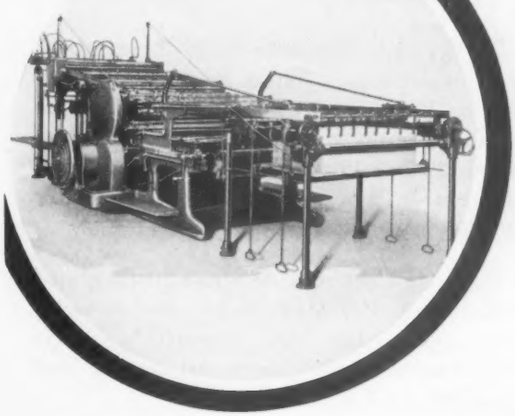

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sociation building in Los Angeles, on 600 tons for tunnel ribs for the Los Angeles metropolitan water district, and on 400 tons for a stage for Warner Bros., Hollywood.

Seattle—New projects are increasing, but are small. Wallace Bridge & Structural Steel Co. has been awarded a contract for fabricating 1200 tons of steel for master piling for the Seattle seawall, the material having been purchased by the city some time ago. Washington Iron Works, Seattle, has the contract to install a 20-ton double radial type cableway at Bonneville, Oreg., dam. This involves assembling two 150-ton towers brought from Boulder dam and a new 225-foot steel tower requiring 140 tons.

Shape Contracts Placed

1350 tons, piling, Cherry creek diversion project, Denver, to Bethlehem Steel Co., Bethlehem, Pa.; Carnegie Steel Co., Pittsburgh; Illinois Steel Co., Chicago; Inland Steel Co., Chicago; and Jones & Laughlin Steel Corp., Pittsburgh.

1200 tons, fabrication master piling for Seattle seawall project, to Wallace Bridge & Structural Steel Co., Seattle. Material previously purchased by city.

850 tons, bridge, Hutchinson, Kans., to Kansas City Structural Steel Co., Kansas City, Mo.

800 tons, armory, Minneapolis, divided between Minneapolis-Moline Power Implement Co. and Crown Iron Works Co., Minneapolis.

570 tons, state bridge, Laurelton parkway, including grades, Montauk division, Long Island railroad, Queens, New York, to McClintic-Marshall Corp., Bethlehem, Pa.; Wilson & English Construction Co., New York, general contractors.

410 tons, grandstand, race track, East Boston, Mass., to Lehigh Structural Steel Co., Allentown, Pa.; A. G. Tomasello & Son Inc., Boston, general contractor. Reported last week as 300 tons.

390 tons, mill building, Dover Boiler Works, Dover, N. J., to Bethlehem Fabricators Inc., Bethlehem, Pa.

300 tons, buildings, St. Peter's college, Jersey City, N. J., to Lehigh Structural Steel Co., Allentown, Pa.

265 tons, bridge, Boston & Ohio railroad, Le Roy, N. Y., to Mt. Vernon Bridge Co., Mt. Vernon, O.

245 tons, out-patient building, Greenpoint hospital, New York, to Berkshire Structural Steel Co., Brooklyn, N. Y.

225 tons, grandstand and race track buildings, Dighton, Mass., to New England Structural Co., Everett, Mass.

200 tons, furniture warehouse, Levenson & Klein Co., Baltimore, to Belmont Iron Works, Eddystone, Pa.; this was previously noted as going to another fabricator.

200 tons, plant building, Campbell Soup Co., Camden, N. J., awarded through Thomas W. Gibson, engineer, Philadelphia, to unnamed fabricator.

200 tons, bridge, Sheffield, Ala., for TVA, to Duffin Iron Co., Chicago.

180 tons, textile factory building, Powhatan Converting Co., Martinsville, Va., to Belmont Iron Works, Eddystone.

175 tons, warehouse, Reading Co., Twentieth and Hamilton, Philadelphia, to the Reading Metalcraft Co., Reading, Pa.

160 tons, train shed, General Motors Corp., Pontiac, Mich., to Jones & Laughlin Steel Corp., Pittsburgh.

150 tons, hospital, New Brunswick, N. J., to Breen Iron Works, Newark, N. J.

150 tons, bridge, Lufkin, Tex., to Austin Bros., Dallas, Tex.

150 tons, repairs to Neville Island bridge, for Allegheny county, Pennsylvania, to Fort Pitt Bridge Works, Pittsburgh.

140 tons, 225-foot tower, Bonneville Oreg., dam cableway system, to Washington Iron Works, Seattle.

140 tons, state undercrossing, Tenino, Wash., to unstated interests.

125 tons, educational building, William and Mary college, Maryland, to Standard Iron Works, Baltimore.

115 tons, store buildings, Bronx, N. Y., to Prudential Iron Works, Bronx, N. Y.

110 tons, state bridge NRH-M 141, part two, Tate county, Mississippi, to Virginia Bridge & Iron Co., Roanoke, Va.

100 tons, postoffice, Hollywood, Calif., to Pacific Coast Steel Corp., San Francisco.

100 tons, one 180-ton transfer car, specification 673-D, Boulder dam, Nevada, to unnamed interest.

100 tons, aggregate plant, metropolitan water district, Fargo, Calif., to unnamed interest.

100 tons, Landsburg dam, Seattle, and

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miscellaneous, to Wallace Bridge & Structural Steel Co., Seattle.

125 tons, shapes and bars, high school, Oak Bluffs, Mass., shapes to John E. Cox Inc., Fall River, Mass., bars to Kalman Steel Corp., Bethlehem, Pa.

Shape Contracts Pending

9000 tons, addition to Library of Congress, Washington, bids May 15; opening of bids on this project has been postponed several times; project will also require 370 tons of reinforcing bars and substantial quantity of sheets for ventilator work and shelving.

3000 tons, Westchester county home, Eastview, N. Y.

1700 tons, piling, seawall, Monroe, La.

1000 tons, plant building, Downingtown Paper Co., Downingtown, Pa.

900 tons, building, National Can Co., Brooklyn, N. Y.

875 tons, incinerator, Flushing, N. Y.; William Kennedy Construction Co., Brooklyn, N. Y.

850 tons, California Walnut Growers' association building, Los Angeles; bids opened.

790 tons, and 600 tons of reinforcing bars, Main street bridge, Columbus, O.; General Asphalt Paving Co., Canton, O., low for general contract.

670 tons, Elk river bridge, Athens, Ga., for Tennessee valley authority, Knoxville, Tenn.

560 tons, bridge, New Orleans, La.

550 tons, state bridge, Greene county, New York, readvertised.

500 tons, home for mental defectives, Allegheny county, Pennsylvania; bids May 15.

450 tons, shop building, National Superior Co., Toledo, O.; bids in.

400 tons, Warner Bros. stage, Hollywood, Calif.; bids May 8.

382 tons, state bridge, Galena, Ill.; Duffin Iron Co., Chicago, low.

350 tons, buildings for Chicago sanitary district, Calumet area; bids May 16.

250 tons, Michigan avenue bridge, Lansing, Mich.; bids being taken.

200 tons, cranes, Sheffield, Ala., dam.

200 tons, sewage treatment plant, Waukegan, Ill.; Hanson Bros. Co., Chicago, low for general contract.

180 tons, trashrack frames and bars, screens and grilled doors, Tygart river reservoir dam, Grafton, W. Va.; bids to Pittsburgh army engineers May 22.

180 tons, state undercrossing, Pierce county, Washington; bids in.

102 tons, structural steel and reinforcing bars, relocation of Baltimore & Ohio railroad tracks in the Beach City reservoir site near Beach City, O., Muskingum river watershed, also included 2300 rods of right-of-way fencing; general contract bids received by Zanesville, O., engineers.

Unstated, 145-foot steel girder state span, Chelan county, Washington; bids May 21.

Semifinished

Semifinished Prices, Page 59

A fair volume of forging-quality billet specifications continues to be noted in the semifinished steel market. Apparently, opposition to the base size definition of forging quality billets has disappeared. From the standpoint of tonnage, sheet bars still are the most active in the semifinished market. Billets, blooms and slabs hold at $27, Pittsburgh; sheet bars, $28 and common wire rods, $38.

Reinforcing

Reinforcing Bar Prices, Page 59

New York—Inquiry is heavier led by needs for the New York tunnel approach and plaza for the Manhattan-Weehawken, N. J. tunnel under the Hudson river. Alternates will be taken on bar material to be used with cast iron tunnel lining or steel. If the former is accepted the project will take 1131 tons of reinforcing bars and if the project goes steel 1388 tons will be needed. Bids close June 6 with the port of New York authority. Awards are light.

Pittsburgh—Absence of Pennsylvania state highway projects is felt keenly by reinforcing steel bar distributors. An intrastate freight rate surcharge now is in effect in Pennsylvania.

Cleveland—Award of 580 tons for the Beach City dam in the Muskingum, Ohio, conservancy district, to American Rolling Mill Co., Middle-

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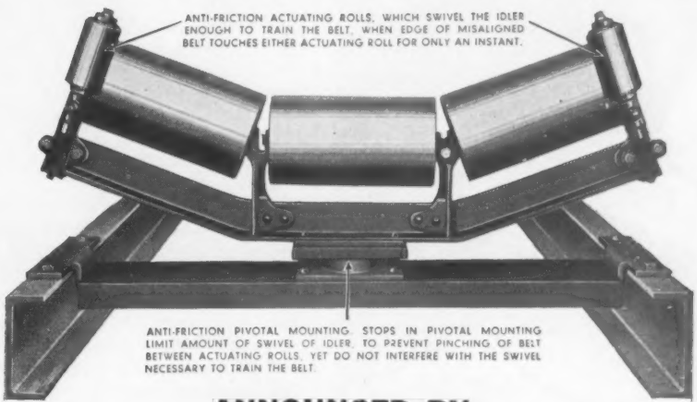
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Steel 5286-E

town, O., features the market. Bids are to be taken shortly on several additional lots for this project, including 108 tons for the Leesdale dam, May 24. General contract bids were opened last week for the Main street bridge, Columbus, which will require 600 tons of bars.

Chicago—Low bidders on general contracts for three large projects involving about 2000 tons of bars have been announced. These include the Armour & Co. plant, a sewage disposal plant at Waukegan, Ill., and a state bridge in Will county, Illinois. Additional bar orders for Illinois road work are in prospect but inquiries for private construction are fewer. Shipments against old orders are increasing.

Boston—Small-lot buying of reinforcing bars is fairly brisk, but with the exception of a dam at Enfield, Mass., taking several hundred tons and a 700-ton grandstand, East Boston, projects requiring substantial tonnage are few.

Philadelphia—More private industrial work is active than public work. Included in the former are 200 tons for a textile building at Allentown, Pa., 100 tons for a chemical manufacturing building, Philadelphia, and an unstated tonnage for a glass company at Bridgeton, N. J. Billet steel bars, cut lengths, are 2.36c, Philadelphia.

San Francisco—Outstanding among awards were 427 tons for the Gaffey street bridge in Los Angeles, placed with Blue Diamond Corp., Los Angeles. Awards aggregated 1964 tons and brought the total for the year to 52,421 tons for the corresponding period in 1934. Activity in the southern part of California is more pronounced than it is in the northern part of the state or in Oregon or Washington. Bids will be opened May 22 for the Foger avenue subway, Berkeley, Calif., requiring 300 tons. A crossing at Newport, Calif., up for figures soon, will take over 350 tons.

Seattle—Small tonnages predominate, but the aggregate is increasing. Hendrickson-Alstrom Co., Seattle, general contractors for postoffices at Puyallup and Mt. Vernon, Wash.,

Concrete Awards Compared

	Tons
Week ended May 11	3,907
Week ended May 4	1,017
Week ended April 27	1,712
This week in 1934	3,318
Weekly average, 1934	4,084
Weekly average, 1935	5,105
Weekly average, April	6,903
Total to date, 1934	97,068
Total to date, 1935	96,998

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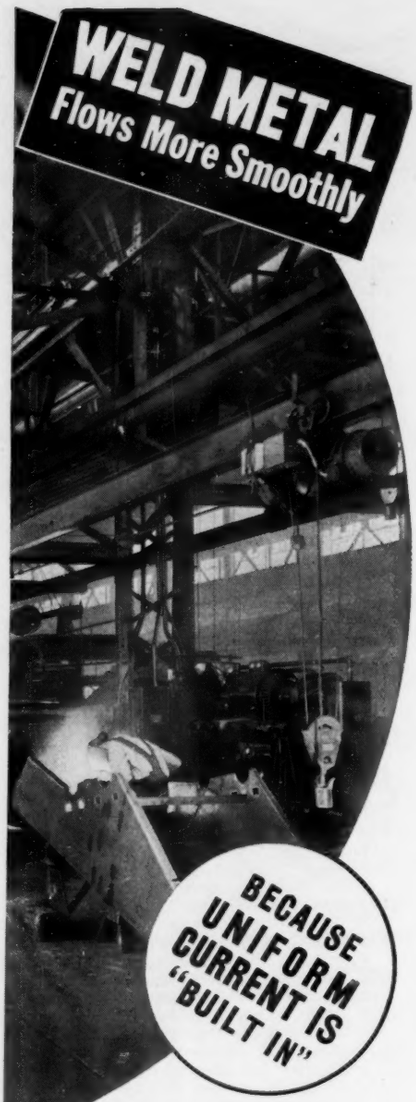

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P&H HANSEN ARC WELDERS

and Central grade school, Missoula, Mont., has sublet 72 tons of reinforcing and 60 tons of shapes to several interests. Northwest Steel Rolling Mills, Seattle, has booked 110 tons for the dormitory at Washington state college, Pullman.

Reinforcing Steel Awards

700 tons, grandstand, race track, East Boston, Mass., to Concrete Steel Co., New York, A. G. Tomasello & Son Inc., Boston, general contractor.

530 tons, Beach City, dam in Muskingum, Ohio, conservancy district, to American Rolling Mill Co., Middletown, O.

450 tons, Cherry creek diversion project, Denver, to Colorado Fuel & Iron Co., Denver.

427 tons, Gaffey street bridge, Los Angeles, to Blue Diamond Corp., Los Angeles.

371 tons, medical detachment barracks and nurses' home, Fort Sam Houston, Texas, to Concrete Engineering Co., San Antonio, Tex.; Robert E. McKee, El Paso, Tex., general contractor.

200 tons, sewer, Hastings, N. Y., divided between National Bridge Works, Long Island City, N. Y., and Concrete Steel Co., New York; through Nicholas de Menna & Sons Inc.

200 tons, highways, Union to Springfield, Union county, New Jersey, to Igoe Bros., Newark, N. J.; through Union Building & Construction Co.

168 tons, Washington junior high scool, Pasadena, Calif., to Concrete Engineering Co., Los Angeles.

167 tons, state underpass, Phoenix, Ariz., to unnamed interest.

150 tons, postoffice, Hollywood, Calif., to unnamed interest.

144 tons, John Burroughs school, Los Angeles, to Blue Diamond Corp., Los Angeles.

132 tons, including 60 tons shapes, Puyallup and Mt. Vernon, Wash., postoffice buildings, and grade school, Missoula, Mont., to various fabricators; Hendrickson-Alstrom Co., Seattle, general contractor.

110 tons, dormitory, Washington state college, Pullman, to Northwest Steel Rolling Mills, Seattle; H. S. Wright & Co., Seattle, general contractor.

108 tons, Junior college, Los Angeles, to unnamed interest.

Reinforcing Steel Pending

2000 tons, estimated, grade crossing elimination, Port Richmond-Tower Hill, Staten Island, N. Y.

900 tons, plant building, Armour & Co., Chicago; Patrick Warren Construction Co., Chicago, low for general contract.

600 tons, and 790 tons of structural shapes, Main street bridge, Columbus, O.; General Asphalt Paving Co., Canton, O.; low for general contract.

600 tons, sewage disposal plant, Waukegan, Ill.; Hanson Bros. Co., Chicago, low for general contract.

564 tons, state bridge, Will county, Illinois; E. J. Albrecht Co., Chicago, low for general contract.

450 tons, incinerator, Flushing, Queens, N. Y.

370 tons, Library of Congress addition, Washington; bids May 15.

353 tons, crossing, Newport, Calif.; bids soon.

285 tons, Folger avenue subway, Berkeley, Calif., for state; bids May 22.

235 tons, Bronx and Bronx Kills piers, Triboro bridge, New York; bids June 3.

116 tons, state bridge, Galena, Ill.

125 tons, bridge in Campbell county, Kentucky, for state highway department.

108 tons, Leesville dam in Muskingum, Ohio, conservancy district; bids May 24 to United States engineers, Zanesville, O.

105 tons, Girls' high school, San Francisco; bids rejected.

103 tons, Succor creek division, Owyhee reclamation project, Oregon and Idaho; Morrison-Knudsen Co., Boise City, Idaho, low.

100 tons, 2-story factory building, Lenning Chemical Co., Philadelphia; bids May 17.

Unstated tonnage, Owens-Illinois Glass Co., factory building, Bridgeton, N. J.

Strip Steel

Strip Prices, Page 59

Pittsburgh—Base prices of 1.85c, Pittsburgh on hot-rolled strip steel and 2.60c, Pittsburgh on cold-rolled strip steel are both likely to be carried over into third quarter. Even though current strip steel buying shows a slower trend it is not generally because of excessive inventories in the hands of consumers. Many important buyers, such as the automotive industry, are purposely reducing floats.

Cleveland—Strip mill operations here last week held at 45 per cent, the failure to settle Chevrolet labor difficulties checking the volume of specifications. Ford's production is lighter, but good releases have been received from both Ford and Chrysler. Miscellaneous requirements are light.

Chicago—While demand for both hot and cold-rolled strip is fairly steady, a decrease is noted compared with the rate of preceding weeks. Buying is largely in moderate lots for early needs.

Boston—Demand for cold-rolled strip for miscellaneous uses furnishes most business, which is inclined to be irregular. Most producers have limited backlogs. Automotive requirements have tapered considerably. Hot strip is dull.

New York—Buying of steel strip is spotty, with indications pointing to even less activity.

Philadelphia—Narrow strip is moving in small quantities into diversified lines, with total volume probably on a parity with a week ago. Narrow hot-rolled strip is 2.16c, Philadelphia, and cold-finished, 2.91c.

Tin Plate

Tin Plate Prices, Page 58

Pittsburgh—Tin plate production last week recouped a part of the loss recorded the week before by gaining 5 points to an average of 80 per cent for the industry. There appears to

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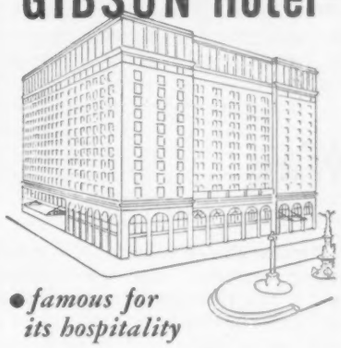

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be no sign of an early break in tin plate operations, owing to continued heavy consumption by canmakers, and uninterrupted volume of specifications issued last week for June delivery. The price is steady at $5.25, Pittsburgh, per base box.

Youngstown, O.—While the tin plate trade has entered a quiet period, this is not unexpected and is believed temporary. Canmakers are awaiting more definite information on crop prospects. Figures are not yet available on the probable tin plate requirements of canners over the next several months.

New York—Tin plate specifications continue active, some sellers reporting tonnage as heavy as at any time this year.

Wire

Wire Prices, Page 59

Pittsburgh—While some wire producing interests last week favored a $2 a ton increase in wire products for third quarter, other producers argued for an unchanged price. Demand for wire products, now at an annual peak, finds productive facilities in this district engaged at better than 45 per cent of capacity. Carload quantity prices on nails remain firm at $2.60, base Pittsburgh, with plain manufacturing wire at 2.30c, base, and spring wire 3.20c. Pittsburgh wire producers experience competition of imported wire products along the south Atlantic and Gulf coasts.

Cleveland—A strong demand for agricultural material is offset by a lower volume of specifications from the automotive industry, manufacturers' requirements being affected adversely by strikes and shipping suspensions. Jobbers are buying conservatively for immediate market requirements.

Chicago—Manufacturers' wire demand from miscellaneous consumers is holding well in contrast to declining requirements in the automotive industry. Activity in merchant products is spotty and has been slower than was anticipated in some areas. In other sections, the northwest in particular, a marked increase has been shown in sales of barbed wire, fencing and other products. Nails still are moving slowly in practically all districts.

Boston—Wire buying is fairly well sustained, with little change in operations in most departments. Specialties and manufacturers' wire lead in demand and cable, rope and heavier products have been below expectations.

Ferroalloys

Ferroalloy Prices, Page 60

New York—Despite the downward tendency in steelmaking operations, ferromanganese shipments have remained steady and this also appears to be true of domestic spiegeleisen. Ferromanganese is unchanged at $85, duty paid, Atlantic and Gulf ports, and domestic spiegeleisen, 19 to 21 per cent, at $26, Palmerton, Pa., on lots up to 50 tons and $24 on 50 tons and over.

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Pig Iron

Pig Iron Prices, Page 60

Pittsburgh—After a continuous run of 115 days, Shenango Furnace Co. banked its one active merchant blast furnace at Sharpsville, Pa., late last week. Foundries in this district are buying no more than carload lots at a time. Since the application of freight rate surcharges for intrastate shipment May 6, pig iron delivered in the Pittsburgh district formerly taking a 63-cent rate now takes 67 cents, the 76-cent rate is now 81 cents, and the $1.13 rate is now $1.21. These three rates, plus arbitrary 50-cent switching rate which is not affected by the surcharge, are all switching rates within the Pittsburgh district.

Cleveland—Sales during the week were restricted to a few carloads, one of the lightest week's business this year. Shipments, however, showed little change from the preceding week. Melters, operating at a lower rate, appear indifferent to possibilities for a price advance for third quarter. A decision on the question of advancing intrastate freight rates is expected within 24 hours after the interstate commerce commission meets with the Ohio public utilities commission and shippers in Columbus, May 13.

Chicago—Pig iron shipments show little change but foundry operations in some industries are tending downward. The decrease is small, however, and curtailment of production of automotive castings so far has been slight. Farm implement plants continue busy in the building of tractors. New pig iron orders are in steady volume though foundries are awaiting announcement of third quarter prices rather than buying in anticipation of a possible advance for that period. The market continues $18.50, furnace, for No. 2 foundry and malleable.

Boston—Pig iron buying has improved with more car shipments. There has been some improvement in foundry melt in several sections, notably in Connecticut. Buying has been well distributed, with no substantial tonnage orders noted. Code prices are unchanged although one foreign iron from stock is moving around 50 cents a ton lower on the whole.

New York—Pig iron shipments show little fluctuation, with orders small and total volume light. What is believed to be the first arrival of Russian pig iron in this country landed here recently and involved about 1500 tons. It is believed to be mostly foundry iron.

Philadelphia—Pig iron shipments

show little variation and are confined almost entirely to small lots. However, some sellers still look for a slight increase in the foundry melt over the remainder of this month.

Buffalo—Large tonnages are moving by water to Detroit and other ports, and a record movement is in prospect if this commerce continues. Barge canal shipments are opening up fairly well. Rail movement has been light since the freight rate boost. Demand is improving slowly as consumers exhaust supplies purchased early in the quarter, but is still slow. Six furnaces continue in blast here.

Youngstown, O.—Pig iron transactions continue to involve small lots, aside from deliveries of hot metal to ingot mold makers. The Struthers blast furnace is the only merchant stack in the two valleys which is preparing to resume blowing some time later in the month or early June. Foundry grades lead demand.

Cincinnati—Shipments of pig iron remain at a level considerably below peaks reached in the first quarter and the early part of April, foundry activity having tapered, only partly blamed to labor disputes in the automotive field.

St. Louis—Purchasing and shipments of pig iron during the past week or ten days have developed well defined recessionary tendencies. This was to be expected, however, in view of the heavy movement during April. Releases of gray and malleable castings to the automotive industry are reported in better volume than expected, in view of the labor situation and future uncertainties. Jobbing plant operations are spotty.

Birmingham, Ala.—Production has been reduced, coincident with banking one of the larger blast furnaces of Tennessee Coal, Iron & Railroad Co., on basic iron. Foundry iron producers are making about as much stock as is required under slightly improved conditions.

Toronto, Ont.—After minor suspension of business in the Canadian pig iron markets as a result of the Jubilee holiday on Monday, orders are regaining former volume. Melters are holding strictly to spot buying, although the daily melt is improving.

Metallurgical Coke

Coke Prices, Page 59

By-product coke volume is now feeling the full effect of the slack season and little fresh demand is reported. Most retailer and consumer stocks appear to be adequate and coke oven operators likewise have been stocking to an extent in view of sustained operations by most blast furnaces. Beehive coke is moving slowly and sales of furnace coke under the guise of heating coke have been reported at obviously a lower figure. The nominal price on beehive furnace coke is $3.60 per ton, Connellsville, Pa., oven basis, but sales down to $3.40 have have been recorded. Foundry coke is firmer at $4.60 and consumers of premium foundry coke are paying $5.10, ad in some cases $5.35 per ton.

By-product coke shipments at Chicago hold at the recent rate and prices are unchanged. Specifications for by-product coke at Cincinnati are lighter. A quotation of $9.45, delivered Cincinnati, has been adopted by Ohio ovens. At St. Louis shipments are keeping up well at unchanged prices.

Scrap

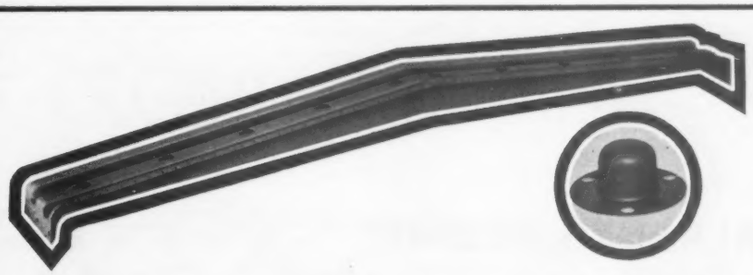
Scrap Prices, Page 61

Pittsburgh — Brokers' buying activities, finding prices of as high as $12 and $12.25 being extended for heavy melting steel delivered locally, forced that market 50 cents higher last week to a quoted range of $11.75 to $12.25. The Pennsylvania railroad's 5300 tons of No. 1 steel were disposed of piecemeal from $11.95 up to $12.35 for local or nearby delivery. Consuming mills here are becoming interested in the market, but for the time being have not exhibited a pronounced buying desire.

Cleveland—Prices are holding firm on steel and iron scrap, yards have been almost denuded to fill contracts and melters are out of the market. Increased prices at other centers have given strength in this area.

Chicago—A sale of about 5000 tons of heavy melting steel to a local mill at $10.25 represents an advance of 25 cents a ton over a previous purchase. Brokers continue to offer as high as $10.80 in covering old contracts and there is some expectation of a further advance in the consumers' market despite unwillingness on the part of at least one mill to pay more than $10. Additional buying is anticipated soon as mill stocks in some instances are low. Steel foundry grades are quiet, but malleable scrap continues in good demand.

Boston—Scrap is more active with prices firmer. Buying for export has taken a decided spurt, with dealers paying $8.50, dock, for No. 1 melting steel, with this price bettered in some instances. The Worcester,



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Mass., consumer is also buying more scrap, paying $8.50, delivered, for No. 1. Turnings have been shipped to Pennsylvania at better prices while heavy cast has advanced 25 cents.

New York — Most scrap buying is for export with dealers paying unchanged prices for heavy melting steel at barges. Domestic mills are taking little material from this district. Prices are steady and turnings continue to display additional strength from their recent low.

Philadelphia — Although there have been no important purchases within the past 10 days or so, or since 5000 tons was placed by a Claymont, Del., consumer, the market on No. 1 steel is now slightly higher at the flat price of $10.50, delivered. No. 2 heavy melting steel also is slightly higher at $9 to $9.50 and heavy breakable cast at $10.50. All other leading grades are unchanged, but the tendency is slightly upward, notwithstanding the fact that steelmaking operations appear to be tending downward. Export prices on No. 1 and No. 2 steels are unchanged at $9.50 and $8.50, wharf, respectively. A feature is resumption of a lively demand from Italy for No. 2 steel.

Buffalo—Dealers are resisting efforts of consumers to establish $10 for No. 1 heavy melting steel. This new offer, while 50 cents above the previous bid, is held much too low to bring out tonnage sales of this material or of No. 2 heavy melting steel at $8.50, based on the usual spread. Dealers offer as much or in some instances possibly slightly more than consumers for some grades. Consumers show considerable interest in all grades.

Youngstown, O.—Scrap is quiet in this district. Occasionally an important steelmaker steps out and buys small tonnages, as it has been doing for several months. One such lot of No. 2 heavy steel went at $10.25, about the going market level.

Cincinnati — Large consumers of iron and steel scrap continue pressure on prices, with the result that such contracts that might be available are not attractive to dealers.

St. Louis—Prices of iron and steel scrap are steady but buying is almost absent. Dealer backlogs have been substantially decreased and until new business is forthcoming bidding is likely to remain apathetic.

Birmingham, Ala.—Little change is noted in the steel and iron scrap market and prices are unchanged. Melters have sufficient stocks for current needs.

Seattle — The Japanese market continues weak, exporters feeling competition of increased buying of pig iron by Japanese interests. Consequently little new scrap business has been booked. Dealers on this side are accumulating stocks in the expectation the export demand will improve. An 1800-ton steel drydock has been sold by Todd Dry Docks Inc., Seattle, for breaking up. Three full cargoes are reported closed by California interests on a basis of $3.50 freight, free discharge. Dulien Steel Products Inc., Seattle, has purchased for resale or scrapping the equipment of the Donovan-Corkery Logging Co., Aberdeen, Wash., including 35 miles of railroad, five locomotives, 120 logging cars, 27 donkey engines and other material.

Toronto, Ont. — Demand for iron and steel scrap is steady. Sales of steel grades, particularly heavy melting steel, have improved and shipments to the Hamilton district are better. Montreal dealers report more active demand for steel scrap with some good prospective export business. Iron grades are spotty.

Warehouse

Warehouse Prices, Page 62

New York—Floor plates have been advanced 5 cents per hundred pounds and an arbitrary extra on wide lengths and widths of No. 10 and 12 blue annealed sheets, 50 cents per 100 pounds on the former, and 55 cents on the latter, is now effective. Buying has rebounded to last month's rate and is well spread.

Philadelphia— Jobbers here are advancing prices three points to cover the recent increases in freight rates. Demand generally over the past week has declined, the dullest in a number of weeks.

Cleveland—Demand for both the lighter and heavy finished steel products from warehouse has shown further moderate decline, which sellers attribute mainly to labor difficulties at consumers' plants. Tonnage booked so far this month is less than in the comparable period in April.

Chicago—Sales show a small decrease compared with a month ago, the recession being no greater than had been anticipated. Prices are unchanged.

Cincinnati — Demand for steel products from warehouse is barely holding at April levels. Prices are unchanged.

St. Louis—Business of warehousemen has been adversely affected by cold weather. Two interests report a noticeable slowing in sales.

Seattle — April volume for warehouses was satisfactory, heavier than March but not as large as in April, 1934. Occasional mill lots are being booked. Prices are unchanged but dealers are adding the 2 per cent state sales tax wherever it applies.

Bolts, Nuts, Rivets

Bolt, Nut, Rivet Prices, Page 59

Shipping suspension on bolts and nuts were reported in many instances last week from automobile manufacturers. Specifications and shipments covering bolt and nut items have

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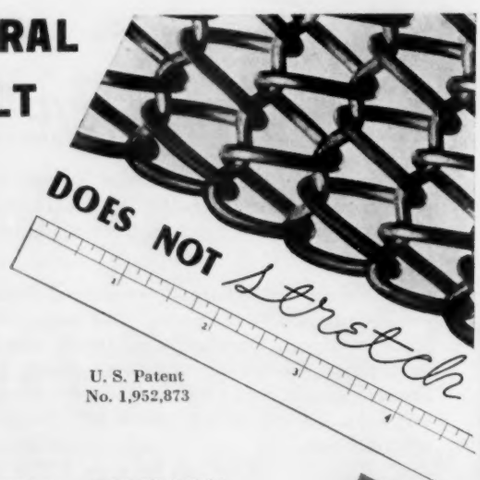

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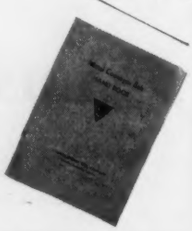

been below volume in the first ten days of April. Irregularity continues from the official schedule of 70-10-5 off list. Large rivets are steady at 2.90c, Pittsburgh and Cleveland, 3.00c, Chicago. Most buying is in small lots.

While specifications for bolts, nuts and rivets are fairly steady at Chicago the tendency is downward slightly. Some improvement in demand from railroads for track work is noted.

Nut and bolt production at Cleveland has been restricted by the Chevrolet labor difficulties, but late last week some specifications were released for production, to be shipped when assemblies are resumed. Orders from railroads and jobbers have declined.

Hexagon cap screws, upset, 1-inch and smaller, have been reduced by raising the discount from 85 to 87½ off list; and square head set screws, upset, 1-inch and smaller, by increasing the discount from 70-10 to 80. Headless set screws continue at 75 off, while makers of milled hexagon cap screws have not yet revised their discount. Nut and bolt prices generally are easier.

Iron Ore

Iron Ore Prices, Page 61

Cleveland—Since steel companies have made up tentative shipping schedules for the season, the composite indicates at this time an increase of about 10 per cent for the season, which would bring the total tonnage to 25,000,000, or 5,000,000 tons less than some estimates made a month ago. Practically all consumers now have specified their prospective requirements, which are subject to change as conditions arise.

As the ore producing industry is operating at only one-third of capacity, and for several years has had difficulty in rotating mine operations to give some employment to miners, the danger of a strike is considered remote. More than 10,000,000 tons of ore is in mine stockpiles, ready for shipment; reserves at lower lake ports and furnaces are several millions tons above normal. Despite demands for a 50 per cent wage increase and a 7-hour day, it is said, the miners do not want to strike.

Shipments from upper lake ports in April amounted to 400,062 tons, as reported in STEEL, May 6, but only 299,209 tons were received at lower lake ports, the difference representing the amount in transit at the close of the month. The Lake Superior Iron Ore association reports receipts at Lake Erie ports and dock balances May 1 in gross tons:

	Receipts	Ship-ments	Dock Balance May 1 1935
Buffalo	50,268	28	2,843
Erie	.....	8,951	85,974
Conneaut	.....	122,508	1,563,188
Ashtabula	.....	94,711	1,180,879
Fairport	8,092	8,152	387,403
Cleveland	35,421	211,210	611,732
Lorain	9,525	9,670	12,527
Huron	7,555	8,672	316,953
Toledo	8,022	10,139	11,705
Total	118,883	474,041	4,173,204
Comparative 1 year ago	.....	416,225	4,570,626

Receipts at other ports:

	Tons
Detroit	30,119
Indiana Harbor	94,397
South Chicago	29,753
Hamilton, Ontario	26,057
Total	180,326

Refractories

Refractories Prices, Page 60

Pittsburgh—Recent award by Ford Motor Co. to Koppers Construction Co., Pittsburgh, of 122 by-product coke ovens represents indirectly one of the largest inquiries for refractory brick in some time. Contracts covering the brick have not yet been placed. Several blast furnace relining jobs still are active, although the last complete project was the one awarded by the Ford company over six weeks ago. Demand for refractory brick for open-hearth use is slower as steel producers are restricting forward commitments. Prices are steady. Third-quarter prices probably will not be announced before the end of May, or early in June.

Nonferrous Metals

Nonferrous Metal Prices, Page 60

New York—Continued fair activity in lead and zinc with further advances in these metals looked for and strength in both export and casting copper, were the outstanding developments in the nonferrous metals last week.

Copper—Domestic market continued quiet with sales averaging around 900 tons daily. Demand for copper and brass mill product declined. Fair amount of business was done aboard, however, and a sale of export copper was reported Friday at 8.00c, c.i.f., the highest level since June 20, 1934. This advance was reflected in the scrap market which in turn was reflected in casting copper, which

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one seller was quoting 8.12½c, refinery, effective Monday. Electrolytic was unchanged at 9.00c, Connecticut.

Zinc—Increased demand lifted prices $2 a ton Monday and active sales were made at the higher levels during the week with galvanizers taking an active part in the buying movement. The market gives promise of higher prices ahead with slab zinc stocks cut 3126 tons during April to the lowest tonnage on hand since last September. Ore supplies are not too plentiful at the smelters. Prime western was firm at 4.20c, East St. Louis.

Lead—Consumers were well represented in moderate to fair buying last week. One leading seller continued to withdraw from the market before noon after equaling his ore intake. With a fair cut in refined stocks for April expected to be reported, outlook for the market is extremely favorable. Prices held at 3.60c, East St. Louis.

Tin—Consumers have shown little interest in the market but prices held fairly steady. Supplies continued very tight. Prices during the week ranged around 50.50c, on spot.

Antimony—American metal was easier with spot quoted down to 12.50c and futures down to 11.87½c, New York. Chinese spot held nominally at 14.25c while futures dropped to 10.50c, c.i.f. in bond.

Coke By-Products

Coke By-Product Prices, Page 59

New York — Demand for distillates is steady, but slightly below the recent current rate. Bulk of production, however, is going directly into consumption. Naphthalene shipments are holding with prices steadier. Phenol is unchanged and demand for sulphate of ammonia still is brisk. Prices are unchanged.

Steel in Europe

Foreign Steel Prices, Page 62

London — (*By Cable*)—The British pig iron market is quiet, but the expiration of contracts shortly led to expectations of renewed activity. The steel trade also is quiet, the automotive industry presenting the most important outlet. Scottish works are busy. Domestic sheet demand is good but exports are low. Business in galvanized sheets and tin plate is light.

The Continent finds the outlook more hopeful following the temporary agreement for steel imports by British users. French and Belgian markets show improved tone.

Details of the agreement between the British Iron and Steel federation and the Continental steel entente are furnished by Commercial Attache L. W. Meeking, London, to the department of commerce, Washington. The agreement provides for importation by British steelmakers of 167,750 tons of entente steel and iron monthly, the British industry to request the government to remove the tariff increase from 33 1/3 to 50 per cent, and continuation of active negotiations for establishment of a long term agreement. Effective date of the agreement has not been decided.

At the request of the British Iron and Steel Federation, which has reached a temporary agreement for three months with the Continental Steel Cartel, the British treasury has suspended for three months, beginning May 8, the increases in the steel duties which were made effective on March 26, according to a cablegram received in the department of commerce from Acting Commercial Attache Frederic D. Grab, London. During this period former rates apply.

Quicksilver

New York — Quicksilver prices are easy in a quiet market. Round lots of 100 virgin flasks of 76 pounds each are available at $72 a flask, if not lower in some directions, and small lots of 15 to 24 flasks, inclusive, at $73.50, down ½-cent from previously quoted levels.

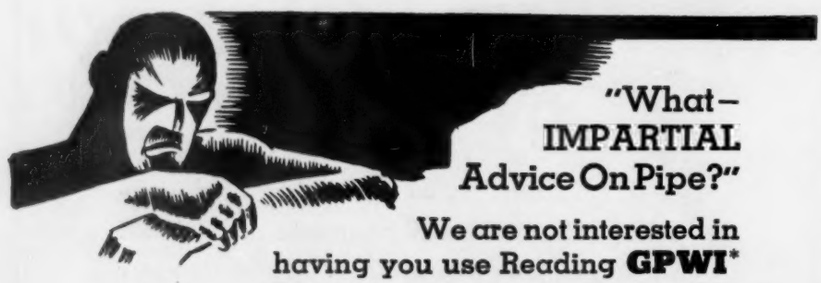
NEELY TO REORGANIZE

Neely Nut & Bolt Co., Pittsburgh, has filed a petition in federal court for the right to reorganize under the amendment section 77-A of the bankruptcy act. A. Lyle Linderman, secretary and treasurer of the company, has been named temporary trustee by Judge R. M. Gibson of the federal court at Pittsburgh, pending a hearing. Mr. Linderman's bond has been set at $10,000.

The concern states its assets at $1,126,128 and liabilities at $253,495, exclusive of capital stock, surplus and reserve. It is a manufacturer of hot and cold punched nuts and bolts with plant located at 2101 Wharton street, Pittsburgh.

Equipment

Pittsburgh — Pittsburgh Cold Rolled Steel Co., Verona, Pa., idle for several years, is planning to reopen its plant. Equipment likely will be required as the company states it will resume on cold-rolled strip production; formerly, experiments on production of copper-coated strip steel were carried on. Thomas Steel Co., Warren, O., has placed an order with Cold Metal Process Co., Youngstown, O., for a mill to roll narrow sizes. Surface Combustion Co., Toledo, O., has been awarded contracts for the heating furnaces required for the Great Lakes Steel Corp. new continuous strip mill at Detroit. Westinghouse Electric & Mfg. Co., East Pittsburgh, last week reported receipt of an order valued at $1,250,000 from Bethlehem Steel Co. for equipment at the latter's new continuous mill at Buffalo. The order



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covers motors, control and power equipment largely. Westinghouse also received contracts for part of the electrical apparatus to be installed in the new strip mills of American Sheet & Tin Plate Co., Gary, Ind., although the major portion of this later contract will be supplied by Allis-Chalmers Mfg. Co., Milwaukee.

Boston—Having shared well in recent government awards, several New England machine tool builders have good backlogs and are operating steadily. Private industry is buying one or two tools at a time and a fair volume has been figured. Textile machinery shops in a few instances have some foreign business, but domestic buying of this type of equipment is light.

Chicago—Except in few instances, machinery and equipment markets here are quieter. Machine tool orders and inquiries are lighter than a month ago, with demand for small tools also slightly less active. The largest inquiry pending is from the the Chicago sanitary district calling for about 12 tools for a new machine shop to be built in the Calumet area; bids close May 16. Several inquiries have appeared from the government, but these are principally for navy machine shops on the eastern and western coasts. A pickup in automotive tool buying has had but little influence on the local market. Steel mill equipment builders in this district are participating in orders for the new installation of the American Sheet & Tin Plate Co. at Gary, principally the Continental Roll & Steel Foundry Co. and Allis-Chalmers Mfg. Co. Plans for the building of a new power plant at Gary to serve the American Sheet & Tin Plate Co. are understood to have been dropped.

Washington—Army ordnance department has made further awards of machine tools and miscellaneous equipment to a group of 54 suppliers. Total on this new business amounts to $419,621.20, bringing the grand total on all awards from this source to date to $2,079,726.79.

Seattle—S. Morgan Smith Co., York, Pa., has received the award from United States engineer, Portland, for furnishing two 60,000 horsepower generators for the Bonneville dam project on a bid of $113,329, this including accessories. Bids for farm implements and hardware for the Matanuska colony have been opened at Seattle by the interior department. Seattle opened bids May 10 for ten electric driven motor hoists for Tainter gates, Landsburg dam project. Seattle has purchased pump units from the Dayton-Dowd Co. and automatic heat control panels from General Electric. Machinery and equipment are involved in the cableway system of the Bonneville project, subcontract to Washington Iron Works, Seattle.

Construction and Enterprise

New York

LONG ISLAND CITY, N. Y.—Roman-Callman Co., 24-02 Bridge plaza, New York, has closed negotiations for erection of a fireproof building with railroad siding to be builit on a plot 150 x 200 feet, on Borden avenue and Twenty-fifth street, for the Montauk Iron & Steel Corp., 11 West Forty-second street, New York, to be used as a warehouse for the storage and distribution of structural steel, steel plates and specialties.

NORTH TONAWANDA, N. Y.—Argonaut Aircraft Co. has leased the Kittinger factory building here, and is starting commercial production of a low-cost airplane. Howard J. Heindell is general manager.

TONAWANDA, N. Y.—Columbus McKinnon Chain Corp. will establish a plant to supply the African trade in Vereeniging, Transvaal, South Africa, beginning production about July 1. Men will be sent from the Tonawanda plant to establish the new works.

Ohio

CLEVELAND—Arthur Livingston, of Buffalo, has leased a plant of 15,000 square feet at 5389 Settlement road, Parma, O., for use as a wallpaper factory.

CLEVELAND — Bearing Bronze Casting Co. has been incorporated by M. G. Leypoldt, E. C. Manning, C. L. Hange and R. E. Meyers, 14010 Woodworth road.

ZANESVILLE, O.—United States engineer office will take bids May 22, schedule 93, two vertical triplex oil pumps and accessories.

Pennsylvania

CLAIRTON, PA.—Carnegie Steel Co., Carnegie building, Pittsburgh, expects to build 16 steel sheet pile clusters and six walkways at the Clairton by-product coke works here.

PHILADELPHIA—Merck & Co. Inc., 916 Parrish street, suffered considerable loss by fire to its chemical plant May 9.

PITTSBURGH—F. W. Woods Laboratory Apparatus Co., Warden street, was damaged by fire May 4.

PITTSBURGH — Anderson Valve Corp., 2733 Koppers building, has recently been incorporated to manufacture valves and other specialties. C. W. Anderson is president.

VERONA, PA. — Pittsburgh Cold Rolled Steel Co. plans to reopen its plant within the next week, after extended idleness. It is stated that the plant will re-employ about 100 men.

Michigan

ANN ARBOR, MICH. — Shoecraft, Drury & McNamee, engineers, are completing plans for a $550,000 sewage plant to be erected for city of Ann Arbor. Plans will mature this month.

BATTLE CREEK, MICH.—Silver Foam Brewing Co. is asking bids through L. J. Sarvis, architect, for construction of an addition, costing approximately $25,000.

DETROIT — Department of public works, city hall, will spend $18,000 for improvements and repairs to the Fairview pumping station, including installation of three new stokers.

DETROIT—Accurate Screw Products Co., 1155 Bellevue avenue, has been formed with $50,000 capital to manufacture screw products, by Herman Winer, 439 Hague avenue.

FARMINGTON TOWNSHIP, MICH. —Union Equipment Co. Inc., 28424 Grand River avenue, has been incorporated with $40,000 capital to deal in equipment.

GRAND RAPIDS, MICH.—Don Lakie, architect, is preparing revised plans for an addition and general alterations to the Leonard Storage building, Grand Rapids, a $100,000 project, for the Michigan Brewing Co. The company will

(*Please turn to Page* 79)

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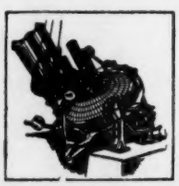

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(Continued from Page 77)

expend $300,000 for modernization and equipment.

KALAMAZOO, MICH. — Kalamazoo Label Co. is planning immediate construction of a $35,000 factory building, which will give the company 23,500 additional square feet of floor space.

MANISTEE, MICH.—Village of Bear Lake, Manistee, Mich., has been allotted fund of $22,000 for construction of a water system.

NASHVILLE, MICH.—A bond issue was passed recently to provide $20,000 for improvements to the village water system.

NILES, MICH.—Simplicity Pattern Co. is planning to erect a factory addition, estimated to cost $8000.

SAGINAW, MICH.—Ideal Mfg. Co., 2400 Holmes street, John L. Arlt, president, is erecting a factory building containing 14,000 square feet of floor space to take care of increased production. The firm manufactures laundry equipment.

Illinois

CHICAGO—Edgar T. Ward Co. Inc., 1757 North Kimball avenue, has been incorporated by Edgar T. Ward, Frank Simek and J. C. Steiner, to manufacture mechanical fans and ventilating equipment. Correspondent: Adams, Emerson & Branand, 111 West Monroe street.

CHICAGO — Adams Iron & Wire Works Inc., 3803 South Cottage Grove avenue, has been incorporated by Virginia Laube, John Laube and John Edwards, to engage in manufacture of iron and wire products. Correspondent: Ben Nierenberg, care of Samuel C. Horwitz, 10 South LaSalle street.

ROCK ISLAND, ILL.—Brass foundry at Blake Specialty Co.'s plant, 1600 Mill street, recently was damaged by fire.

WATSEKA, ILL.—Socony-Vacuum Oil Co., 26 Broadway, New York, is starting work immediately to install a bulk plant on the Bell property south of town. Five 20,000-gallon tanks are to be installed. Tom O'Neill will be representative.

Indiana

INDIANAPOLIS—American Bearing Corp. has been formed to manufacture machinery, engines, and bearings of all types, by Peter Lambertus, 215 West Eleventh street, William A. Dail and William C. Beschorman.

ELKHART, IND.—Williams Bros. Inc., 1125 West Beardsley avenue, has been formed to manufacture nonferrous castings, by Ursa S. Williams, resident agent, Sidney W. Williams and Terrance C. Wertz.

FORT WAYNE, IND.—Factory space will be added by the International Fork & Hoe Co., New Haven, Ind., near here, which has let contract for construction of a new building in connection with its steel forging plant. The new unit will measure 40 x 100 feet. Modern factory equipment will be installed.

Kentucky

LOUISVILLE, KY.—Dant Distilling Co., care of J. P. Dant, 1718 Windsor place, plans erecting a new plant, including power house and machine shop. Cost is estimated at $60,000, with equipment.

MIDWAY, KY.—Ralph Greenbaum & Co. Inc., Frankfort, Ky., has acquired the site of the former distilling plant of J. S. Greenbaum Distillery here, and will remodel existing buildings and install equipment. Carl J. Kiefer, Schmidt building, Cincinnati, consulting engineer.

Maryland

BALTIMORE—Edward M. Fleischmann, president, Calvert-Maryland Distilling Co., reports Joseph E. Seagram & Sons Inc., of which the Calvert-Maryland plant is a unit, will begin construction of another distillery near present plant, estimated investment $1,000,000.

District of Columbia

WASHINGTON—Bureau of supplies and accounts, navy department, will take bids May 17, schedule 4955, motor-driven pumps and spares; schedule 4998, one motor-driven bench precision lathe, delivery, Mare Island, Calif.; schedule 5033, one motor-driven heavy-duty engine lathe, delivery Philadelphia; May 24, schedule 5026, turbo-generators, regulators, circuit breakers and spare parts, delivery Puget Sound, Wash.; May 28, schedule 5045, motor-driven, ship service air compressors, delivery San Pedro, Calif.

Louisiana

LOGANSPORT, LA.—Town will take bids May 28 for waterworks system. Work includes 50,000-gallon capacity steel tank on 100-foot tower, all-steel pump house, deep well complete with direct connected electrically-driven centrifugal D. W. pump, service pump, etc.

Mississippi

CRYSTAL SPRINGS, MISS.—E. L. Gulledge, Crystal Springs, and J. C. Thomas, associated with Dorgan McPhillips Packing Corp., Mobile, Ala., have started work on erection of a canning plant.

LAUREL, MISS.—Bradley Bros., Laurel, Miss., have been awarded contract for a 2-story, 126 x 250-foot factory building to be used as a garment factory. Cost is estimated at $70,000. The structure will be leased to the Kaynee Co., 6925 Aetna avenue, Cleveland.

Florida

FORT PIERCE, FLA.—City E. G. Gustafson city manager, receives bids May 15 for furnishing and installing derating feed water heater, turbine driven boiler feed pump, overhead traveling crane trolley and three chain hoist and equipment, and extension of electric switchboard.

FORT MYERS, FLA.—Leey County Packing Co., John M. Dean president, plant rebuilding its burned plant. Work is to begin as soon as plans are completed. Temporary address is Clint Bolick's citrus plant.

North Carolina

BURLINGTON, N. C.—Cherokee Flooring Corp. has been incorporated with $100,000 capital by W. S. Coulter and L. C. Alle, to engage in woodworking.

HEMP, N. C.—R. T. Vanderbilt Co., 230 Park avenue, New York, is constructing a pyrophyllite grinding plant here with daily capacity of 100 tons. The firm operates in North Carolina as Standard Mineral Co., Hemp.

South Carolina

UNION, S. C.—Lyles Ford Tri-County Authority, L. G. Young chairman, Union, has filed application for loan of $13,214,000 from PWA for development of Lyles Ford hydroelectric project.

Tennessee

CHATTANOOGA, TENN.—United States Pipe & Foundry Co., J. T. Giles resident manager, plans $250,000 expansion and improvement program. The Whiteside street fittings plant will

(Please turn to Page 81)

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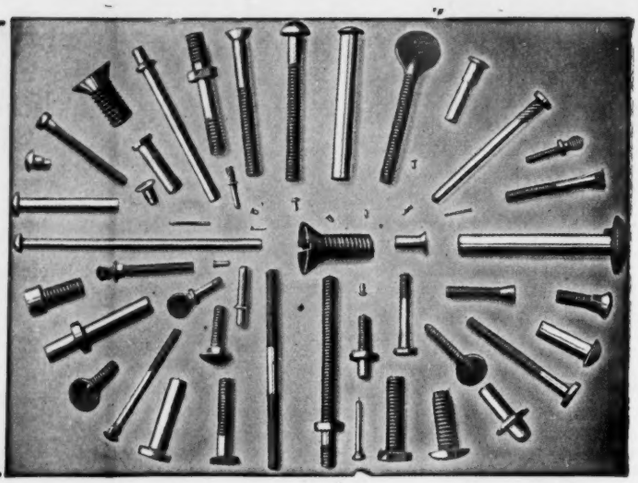

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(*Concluded from Page 79*)

be removed to the Twenty-seventh street plant and a new fittings plant erected. New equipment will be installed in both plants. A new machine and pattern shop, each 175 feet long, will be erected. No. 1 shop at the Twenty-seventh street plant is to be remodeled and new machinery installed. Work will begin as soon as plans are completed by engineering department.

KNOXVILLE, TENN.—Director of purchases, Tennessee Valley Authority, will take bids May 21, for designing, furnishing, fabricating, galvanizing and delivering 37 double circuit steel transmission towers and accessories for the Wilson Dam-Picking Landing dam transmission line.

MEMPHIS, TENN.—City will receive bids soon for a $150,00 city-county abattoir to be erected at Riverside and Rhode Island avenue.

NASHVILLE, TENN.—City, Hilary E. Howse mayor, will receive bids May 28 for constructing refuse incinerator plant.

SMYRNA, TENN.—Boiler room of the Smyrna Lumber Co.'s plant was recently damaged by fire.

West Virginia

CHARLESTON, W. VA.—Fairmont Machinery Co. has been organized with $200,000 capital to manufacture machinery, cars, tipples and other equipment.

Missouri

LOUISIANA, MO.—City, W. A. Fuller Co., Shenandoah avenue, St. Louis, engineer, returned bids scheduled to be opened May 1 and will advertise for new bids for $145,000 waterworks system.

Arkansas

FORT SMITH, ARK.—Ozark Distillers Inc., A. S. Bullock secretary, has purchased a site for erection of a distillery.

WALDRON, ARK.—Town receives bids May 15 for waterworks system. PWA allotment of $51,000 available. Alex Allaire, state PWA engineer.

Texas

HOUSTON, TEX.—Garrett Engineering Co., 308 Hughes street, wants data and prices on all material and supplies for project at Liberty, Tex. Project comprises electric power plant, including generators, engines, switchboards, plant wiring, and transformers; distribution system, consisting of overhead wiring, poles, transformers, meters, house drops, etc.

Iowa

DECORAH, IOWA — Prospective building and projects now under way here include erection of a city pump house and a city disposal plant.

Montana

BOZEMAN, MONT.—Bozeman Welding Works garage and machine shop, owned by Sharp Bros., recently sustained severe damages by fire.

GRANITE, MONT.—Philipsburg Mining Co., whose plant recently was damaged by fire, is reported to be considering rebuilding the flotation mill.

GREAT FALLS, MONT.—Pappin & Son has begun construction of a concrete and steel frame structure, 84 x 98 feet, for Firestone Tire & Rubber Co., Akron, O. Installation of two gas tanks is contemplated.

Pacific Coast

AVON, CALIF.—Associated Oil Co., 79 New Montgomery street, San Francisco, plans construction of a lubricating unit at refinery and addition to pressure distillate stabilizing unit. Cost $100,000.

OAKLAND, CALIF.—Construction has been started on addition to plant at Fifty-seventh and Russett street, for the Continental Can Co., 155 Montgomery street, San Francisco. Contractor, Austin Co., 1924 Broadway, Oakland, Calif.

SAN DIEGO, CALIF.—L. B. Norman, 1034-B Seventeenth street, Santa Monica, Calif., will start work shortly on erection of a manufacturing plant here for the Consolidated Aircraft Corp., Buffalo, New York. The building will be a 1-story structure, 300 x 900 feet. Motors, conveyors, controls, electric hoists and other equipment will be installed.

SAN PEDRO, CALIF.—Apex Steel Corp., Sixty-first street and Eastern avenue, has applied for building permit to construct an addition to its machine shop at 955 South Seaside avenue.

JACKSONVILLE, OREG.—Bids will be received by city May 23 for a water system, including 10,000 feet of 6 and 8-inch pipe.

PORTLAND, OREG.—Fire caused considerable damage to the plant and equipment of the Independent Foundry Co., May 3.

PORTLAND, OREG.—United States engineer will take bids May 20, circular 603, for design, manufacture and installation of two 43,200 kilowatt a.c. generators, with spare parts and auxiliary.

BREMERTON, WASH.—Plans are being drawn by Architects Smith & Carroll, Seattle, for a $26,000 reinforced concrete garage, to include offices, storage and machine shops.

EVERETT, WASH.—Preliminary work has started on construction of a $4,000,000 pulp mill to be erected here. The mill will be 1500 feet long and 150 feet wide. F. R. Titcomb, Tacoma building, Tacoma, Wash., is general manager for the owners.

SEATTLE—The city light auxiliary steam plant recently sustained considerable damages by fire to its equipment.

SEATTLE—Plant of the Sound Construction & Engineering Co., 2659 Airport way, general contractor, was damaged by fire May 2.

SEATTLE—Smith Cannery Machinery Co., maker of salmon canning equipment, has purchased a 2-story concrete building at 2428 First avenue, South, to extend operations.

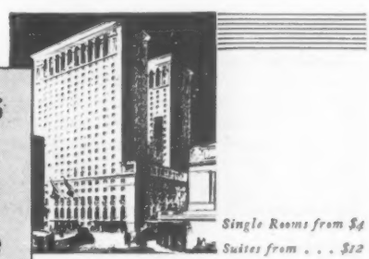
SEATTLE—Rainier Brewing Co. and Century Brewing association have merged under the former's name. Plans include expenditure of $250,000 for construction of a bottling plant and increased storage.

SPOKANE—Chase Engineering Co., South 221 Monroe street, has been incorporated at $25,000, by W. E. Chase and associates, to manufacture and deal in steam engines and boilers.

TACOMA, WASH.—On a 1000-acre tract at Frederickson, 14 miles southeast, a site is being cleared for buildings for the J. A. Denn Power Co., whose plant was destroyed last year. Estimated cost is $200,000.

TONASKET, WASH.—F. M. Baum, Okanongan, Wash., has the contract for building a 170-car cold storage plant here. Machinery and equipment will be required.

YAKIMA, WASH.—Work has started on a $40,000 3-story cold storage plant for A. B. Thiseus, after plans by Architect Francis Fassett.



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